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Ontario
Water Resources
Commission

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Ontario

REPORT ON

AN INDUSTRIAL WASTES SURVEY

of

THE HAMILTON BAY FRONT INDUSTRIES

1971

Division of Industrial Wastes

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During July and August 1971, industrial wastes surveys were conducted at the major Hamilton Bay Front Industries. These surveys were conducted to re-assess and re-evaluate the waste loading contributions from direct discharge from the major industries in this area. Some of the industries visited reported no discharges other than to the municipal sanitary sewer. Any data collected on these industries has been included for the information of the municipality.

The responsibility and jurisdiction for all effluents discharging directly to watercourses rests with the Ontario Water Resources Commission, whether the industry is located within or outside any municipality. The responsibility and jurisdiction for discharges to the municipal treatment system rests with the City of Hamilton, and any inquiries concerning the redirection of waste streams to the sanitary sewer should be directed to the City Engineer.

SUMMARY

A detailed report on each industry surveyed follows under separate headings.

The major problem industries as per this survey and their treatment requirements are as follows:

- (1) Canadian Vegetable Processing Limited
 - rerouting of some waste streams
 - additional treatment to some streams
 - improved housekeeping
- (2) Canron Limited
 - additional settling facilities

- (3) Cities Service Chemicals Limited
 - additional maintenance for existing treatment facilities
- (4) Domtar Chemicals Limited
 - a new and/or improved treatment system for phenol destruction
- (5) M and T Products of Canada Limited
 - extensive chemical treatment required
- (6) National Steel Car Corporation Limited
 - pretreatment and redirection of waste streams
- (7) Stanton Pipes Limited
 - additional settling required

It should be noted that Procter and Gamble Company of Canada Limited report that 8 - 10 million gallons of industrial wastes from their operations are discharged daily to the municipal system. An unknown quantity of this volume is suspected to be uncontaminated cooling water and may require redirection to the storm sewer system.

Although the problem areas discussed in this report are significant, the total waste loadings are overshadowed considerably by the waste loading contributions of the Steel companies also located in the Bay Front area. Both of the Steel companies are currently embarking upon extensive pollution abatement programmes and the current status of these industries have been covered under separate reports.

BURLINGTON STEEL COMPANY -
A DIVISION OF SLATER STEEL INDUSTRIES

Burlington Steel Company is located at 318 Sherman Avenue, and is a fully integrated steel mill producing a diversity of products.

DETAILS OF SURVEY

Personnel Interviewed

Mr. R. T. Haines, P.Eng., Chief Plant Engineer

Mr. F. Moser, P.Eng., Project Engineer

Personnel Participating

Mr. G. V. Buxton - OWRC

Mr. D. R. Ireland - OWRC

Mr. J. C. de la Riviere - OWRC

Description of Plant and Processes

The company manufactures steel from scrap steel by the carbon arc furnace method. The molten steel is cast in billets. Chrome plated copper molds have molten steel injected into them, and the outside is then subjected to a continuous cold water spray thus hardening the steel. The strap formed is cut into billets and they are stored.

To produce steel products, the stored billets are reheated then rolled. The rolling is administered until such time as the desired finish is made. This can be accomplished by many passes along a roll mill where flange, head, end or other type of patterns are pressed. The company produces rounds, squares, angles, flats, channels, fence posts (T-bar shape) and other rolled products, as well as rolled reinforcing steel.

Another operation on the premises involves the production of grinding balls. The balls are made by a cut and press operation using steel rod. The sizes vary from 3/4" to 2".

Production and Operating Data

The mill produces approximately 200,000 tons of steel per year, of which 165,000 tons are finished product.

The operating schedule is as follows:

Hours per day	- 24
Days per week	- 5 - 6
Employees	- 550

Water Consumption and Distribution

In the year 1970 the company used 440 million gallons of water, totally supplied by the City of Hamilton.

The company does not meter the complete water distribution, but has estimated some of its usage as follows:

Melt Mill (quenching)	300,000 gals/day
Ball shop	190,000 "
12" mill	60,000 "
Domestic usage	10,000 "

Sources of Liquid Waste, Disposal and Treatment

The only process water discharged to a storm sewer is the uncontaminated cooling water overflow from furnace "A" in the melt mill. The rate of discharge is estimated at a 100 gallons per minute. This is the smallest furnace and is not used whenever the Company has a cut-back in production.

The ground drains and roof drains also discharge to the storm sewers.

All other waters go to the sanitary sewer. Industrially, this would include the following waters:

Quenching water used to spray the mold for billet production. This water is cooled and recirculated with make-up water added. Water is used as lubricant and coolant in the roll mill, and as a quench bath in the ball mill.

The billets prior to rolling are descaled before being heated. The descaling is done with jets of water being sprayed on the billet surface.

Water is sprayed directly on slag piles to remove heat and to hold down dust and then seeps into the ground.

Slimicides, descalers and other additives are added to the boiler water in the company's low pressure heating system.

The coolant water and other processing waters are handled by nine cooling towers.

Water treatment includes settling devices and screens for particulate matter. Every plant outlet is equipped with Hoffman filters of small mesh size. The inplant waters have cisterns and elbows so constructed as to retard flow and allow the settling of coarse particulate matter.

The settled matter from the roll mill is removed from the basin every few weeks, and from the melt shop basin every couple of months.

The storm sewer that collects the furnace overflow is located at Birch Avenue in the north west plant area.

SAMPLING AND ANALYSIS

No samples were collected at this plant since all contaminated wastewaters enter the municipal sanitary sewer.

CONCLUSIONS

At the time of this survey, there was no evidence of any discharges of contaminated wastes to Hamilton Bay from this source.

RECOMMENDATIONS

No recommendations will be made at this time.

CANADIAN INDUSTRIES LIMITED

The C.I.L. plant at this location produces a number of inorganic and organic chemicals. This plant was visited and sampled on July 20 and July 22, 1971. All processing at this plant will be phased out over the next few years.

DETAILS OF SURVEY

The survey was carried out July 22, 1971 when composite sampling was conducted at two locations over a six hour period, and a few grab samples were taken of waste waters from the chlor-alkali process.

Mr. J. Labash and Mr. P. Osborne were interviewed and provided the necessary data.

Personnel Interviewed

Mr. J. Labash, P.Eng.	- Technical Services Supervisor
Mr. H. W. Bentley, P.Eng.	- Production & Technical Superintendent
Mr. P. Osborne, P.Eng.	- Engineer

Personnel Participating

Mr. G. V. Buxton	- OWRC
Mr. D. R. Ireland	- OWRC
Mr. J. C. de la Riviere	- OWRC

Description of Processes

C.I.L. is a fully integrated chemical complex manufacturing the following products:

- (1) Sulphuric Acid - produced by the contact process.
- (2) Ammonium Chloride and Sodium Sulphite - produced from the reaction of ammonia, sulphur dioxide and sodium chloride. Sodium thiosulphate and zinc ammonium chloride, using zinc chloride flux, are by-products of the reactions.
- (3) Zinc Chloride - produced with zinc from waste products recovery (i.e. fluxes, galvanizings etc.) reacted with chlorine.
- (4) Cereclor - Cereclor products are produced by the reaction of passing chlorine gas through parafins.

- (5) C.P. Reagents - Sulfuric acid and hydrochloric acid are concentrated by distillation.
- (6) Zinc Chloride - produced by contacting chlorine gas with zinc.
- (7) Chlor-alkali - Chlorine gas and caustic are produced by the electrolysis of brine with mercury and carbon electrodes. Sodium hypochlorite is a by-product of the chlorine gas; the chlorine gas is dried in H_2SO_4 and liquefied.
- (8) H-7 - H-7 is the name of an adhesive used in the manufacture of polyester tire cord. The product is produced by batch process, reacting sodium hydroxide with p-chlorophenol to produce p-chlorophenolate. This product is added to formaldehyde, the mixture is cooled, and neutralized with sulphuric acid, filtered, and the residue removed.
- (9) Superphosphates - produced by the reaction of sulphuric acid on phosphate rock. Granular chemicals are produced by screening the product.

The company no longer makes hydrogen peroxide at this location.

Production and Operating Data

The production of chemicals at C.I.L. is as follows:

Contact Sulphuric Acid	260.0	Tons/day
Ammonium Chloride and Sodium Sulphite	26.0	"
Sodium Thiosulphate	5.0	"
Zinc Chloride	14.0	"
CP Reagent HCl	1.4	"
H_2SO_4	0.9	"
Cereclor	8.7	"
Chloralkali chlorine	90.0	"
caustic	108.0	"
H-7 Products	1.05	"

The Superphosphate and granular chemical operation is being phased out and will cease production by the end of 1971.

The company operates 24 hours a day, 7 days a week and employs about 275 people.

Water Consumption and Distribution

The average consumption of water per day is as follows:

From the Bay - 795,800 gallons

From the City - 425,000 gallons (first quarter 1971)

The breakdown of water usage, as estimated by the Company, is as follows:

		<u>In thousands of gal/day</u>
	<u>Bay</u>	<u>City</u>
Contact Sulphuric Acid	676.0	70.2
Ammonium Chloride and Sodium Sulfite	117.0	20.0
Sodium Thiosulphate		6.5
Zinc Chloride	2.8	1.4
C.P. Reagents	Hydrochloric Acid	40.0
	Sulphuric Acid	10.0
Cereclor		2.0
Chlor-alkali		23.8
H-7 products		9.5
Powerhouse		105.0
Domestic Usage estimate		10.0
Warehouse	---	15.0
	795.8	313.4

The figures quoted above are estimates. Mr. Labash of C.I.L. stated that the difference in the daily consumption and the estimate could be distributed overall proportionally.

The water used in the phosphate operation is completely recycled.

The total city water usage in 1970 was 181,832,000 gallons.

Sources of Liquid Wastes, Treatment and Disposal

The sources of liquid wastes are best understood by considering each type of production individually.

Superphosphates

The water used in the production of superphosphates is totally recycled. A system of three settling ponds is utilized, in which the third pond is used as reserve. The first and second ponds are connected in series such that the enriched spent liquor can settle out in the first with the effluent being allowed additional settling time in the second. The water in the second is recirculated back to the process. The phosphate rock is reacted with the drying acid (sulphuric acid) from the chlor-alkali plant.

Chlor-alkali

The electrolysis of brine produces a liquid waste contaminated with mercury. This spent effluent is treated with sodium sulphide and ferric chloride to enable precipitation of any mercury. Currently (May 1971) there was 0.100 lb. in 14,800 gallons of water. This, converted to ppm, is approximately 0.67 ppm. Sodium hypochlorite is produced by the absorption of chlorine liquefaction residual gas into caustic. In the event of a spill, the hypochlorite would be treated with a nickel salt to precipitate sodium chloride.

Contact Sulphuric Acid

The contact plant uses large volumes of Bay water as coolant and discharges this water to the Hamilton Bay.

H-7 Products

The filtrate from the operation described in the processes is trucked to Sarnia where it is disposed of by deep-well injection.

Zinc Chloride

A sludge pond is used to facilitate total recycle. (An earth fill dam prevents access to the drainage ditch).

Ammonium Chloride and Sodium Sulfite

The waste waters generated after the precipitation of both products (each crystalizes out at a different temperature) is discharged into the North Ditch. By-products are made by treatment of the mother liquor effluent. The by-products

are zinc ammonium chloride and sodium thiosulphate.

C.P. Reagents

The distillate from the concentration of the acids is discharged into the East-West Ditch.

SAMPLING AND ANALYSIS

Most sampling was conducted in the area of the Chlor-alkali plant.

The following grab samples were taken from this area on July 22, 1971 -

- 1) from the collection area prior to treatment (11:40 a.m.)
- 2) after the sulphide-iron treatment (11:45 a.m.)
- 3) from the settlers (11:50 a.m.)
- 4) total plant effluent at North Ditch (3:45 p.m.)

A composite sample was taken of the total plant effluent as follows:

- 1) Total plant effluent at North Ditch (10:15 a.m. - 4:15 p.m.)

The composite was taken at the end of the North Ditch immediately before discharge in the harbour slip.

STATEMENT OF RESULTS

The waste loadings as determined by this survey are described below:

WASTE LOADING

Waste	Flow IGPD	Suspended Solids		Mercury as Hg		Iron as Fe	
		ppm	lbs/day	ppm	lbs/day	ppm	lbs/day
Total Plant Effluent at North Ditch	1,200,000	30	360	.004	.048	7.1	85.4

DISCUSSION

The concentration of mercury in the untreated chlor-alkali effluent was 6,500 ppm. After treatment this was greatly reduced and the final plant effluent contained a concentration of 0.004 ppm and contributed a waste loading of 0.048 pounds. The efficiency of the present treatment system was good on the day of sampling.

The total plant discharge at the North Ditch to Hamilton Bay contained a suspended solids concentration of 30 ppm.

CONCLUSIONS

The final effluent from this plant contains traces of mercury (0.004 ppm) and suspended solids slightly in excess of OWRC water quality objectives.

RECOMMENDATIONS

Since this Company is currently phasing out operations at this site, and considering no appreciable pollution problems exist at this time; no recommendations will be made.

ONTARIO WATER RESOURCES COMMISSION
CHEMICAL LABORATORIES

INDUSTRIAL WASTE ANALYSIS

All analyses except pH reported in p.p.m. unless otherwise indicated

1 p.p.m. = 1 mgm. / litre
= 1 lb./100,000 Imp. Gals.

c.c.

Municipality: Milton

Report to: R. Abbott (2)

Ind. Master

D. Robinson, Chem II

Source: C.I.L.

Date Sampled: June 2/71 by: D.R.I.

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Lab. No.	5-Day B.O.D.	Solids									
		Total	Susp.	Diss.							
	Mercury as Hg ppb										
T.G.-5	1.4										
T.G.-6	130.										
T.G.-7	3,800.										
T.G.-8	3,000.										
T.G.-9	54.										
T.G.-30	10,700.										

* Test performed on preserved sample

T.G.-5	1	Total Plant Effluent at ditch	1/2 hr. Comp. 10.30 a.m. - 3.00 p.m.	Duplicate
T.G.-6	-	Lime-Iron Effluent after settling	Grab 10.35 a.m.	Duplicate
T.G.-7	3	Chlor-Alkali Effluent before chemical treatment	Grab 11.10 a.m.	Duplicate
T.G.-8	4	Effluent from Sulphide treatment	Grab 11.40 a.m.	Duplicate
T.G.-9	5	Effluent from Conical Settler after Sulphide treatment	Grab 11.15 a.m.	"
T.G.-30	6	Effluent from Lime Iron Treatment	Grab 1.5 p.m.	Duplicate

All samples preserved with Nitric Acid

**ONTARIO WATER RESOURCES COMMISSION
CHEMICAL LABORATORIES**

All analyses except pH reported in
p.p.m. unless otherwise indicated

INDUSTRIAL WASTE ANALYSIS

1 p.p.m. = 1 mgm. / litre
= 1 lb./100,000 Imp. Gals.

Municipality:	Hamilton			Report to:	G. Buxton			c.c.						
Lab. No.	5-Day B.O.D.	Solids			pH at Lab.	Phosphate as P	Fluoride as F	Iron as Fe						
		Total	Susp.	Diss.										
T29-166		1850	30	1820	6.6	2.9	0.4	7.1						
T29-167		2440	40	2400	7.9	3.3	0.4	12.0						
T29-166	10.	Total plant effluent at north ditch - composite 10:15 a.m. - 4:15 p.m.												
T29-167	11.	Total effluent discharging to bay - grab 3:45 p.m.												

ONTARIO WATER RESOURCES COMMISSION
CHEMICAL LABORATORIES

INDUSTRIAL WASTE ANALYSIS

All analyses except pH reported in
p.p.m. unless otherwise indicated

1 p.p.m. = 1 mgm. / litre
= 1 lb./100,000 Imp. Gals.

Municipality:	Hamilton	Report to:	R. Abbott	c.c.
Source:	C.I.L.		c.c. G. V. Buxton (2 copies)	
Date Sampled:	July 22/71 by: J.C. De la Riviere		D. Robinson (Chem. 11)	(rj)

Lab. No.	5-Day B.O.D.	Solids									
		Total	Susp.	Diss.							
	Mercury as Hg * ppm										
T29-168	.004										
T29-169	6,500										
T29-170	.049										
T29-171	.282										

* Test performed on preserved Sample

T29-168	1	Total Plant Effluent at north ditch	Comp.	10.15 AM - 4.15 PM
T29-169	2	Chlor-Alkali effluent before treatment	Grab	11.40 AM
T29-170	3	Chlor-Alkali effluent after sulphide treatment	Grab	11.45 AM
T29-171	6	Effluent from Conical settler	Grab	11.50 AM

CANADIAN VEGETABLE OIL PROCESSING LTD.

This company is engaged in the production of unhydrogenated oils by extraction from soy beans. The operation will be extended to include rapeseed in October 1971.

DETAILS OF SURVEY

A survey of the company was carried out July 20, 1971. The survey consisted of an interview with Mr. J. McClare, Plant Chemist, and the collection of samples (grab and composite) from the plant.

Personnel Interviewed

Mr. J. McClare, P.Eng. - Plant Chemist

Personnel Participating

Mr. G. V. Buxton - OWRC

Mr. D. R. Ireland - OWRC

Mr. J. C. de la Riviere - OWRC

Description of Process

Bulk soy beans are processed into soy bean oil with by-products being lecithin and meal (used as animal feed). The beans are dried, cracked and flaked. The flakes are solvent washed with the solvent , hexane, being recovered. The extracted oil undergoes distillation and evaporation to remove the solvent, and the spent flakes containing about 1% residual oil, are processed into meal. Water is added to the extracted oil to precipitate the phosphatides (lecithin) which is then separated from the vegetable oil, refined by dehydration and collected for sale.

Soy bean oil is an unsaturated fatty acid that is used by edible oil processors in the production of salad oils, hydrogenated fats and other edible products.

Lecithin, which contains organo-phosphorus, is the gum in soya oil. The gums are refined by dehydration and collected for sale.

The company plans to expand operations to include the processing of rapeseed by October 1971.

Production & Operating Data

Soy Bean (processed)	650 tons/day
Soy Bean Oil	218,400 pounds/day
Lecithin	5,200 pounds/day
Animal Feed	507 tons/day

The mass balance is completed by assuming the moisture removed from the soy beans is equal to the difference in the total soybean processed minus the products.

The plant operates 24 hours a day, seven days a week, employing 50 to 70 people.

Sources of Liquid Wastes and Disposal

Waste water from this plant is directed to both the Hamilton Harbour and to the city sanitary sewer.

The waters currently directed to the sanitary sewer are those from the extraction area, and the domestic sanitary waste and a few surface drains. All other water is directed to the Harbour. This includes storm run-off, floor drains, lecithin process area, filter area etc. The run-off water in surface storm drains would pick up decomposed and/or raw meal and chaff, as well as spilt oil. The boiler water may contain added descaling agents. The water from the filter press area is from a coolant jacket.

SAMPLING AND ANALYSIS

Composite samples were taken from the extraction effluent into the sump and from the refinery sump between 0930 hrs and 1600 hrs. on July 20, 1971. Grab samples were taken of the contents of the extraction sump, the condenser water and the total effluent into the Bay.

These samples were submitted to the OWRC laboratories in Rexdale for analysis.

WATER CONSUMPTION AND DISTRIBUTION

The water used during 1970 as supplied by the City of Hamilton amounted to 36,285,000 gallons, or approximately 100,000 gallons per day. The estimate of

the amount of water drawn from the Bay, as stated by the company, is 1000 GPM and it is used only in the solvent extraction area.

The quantity of water used in the solvent extraction area is 1000 gallons per minute bay water and 45 gallons per minute city water. This is all discharged at present to the city sanitary sewer.

All the water used in the refinery process and from the barometric leg condenser is obtained from the city at 35 GPM and is discharged to the Bay.

WASTE LOADINGS

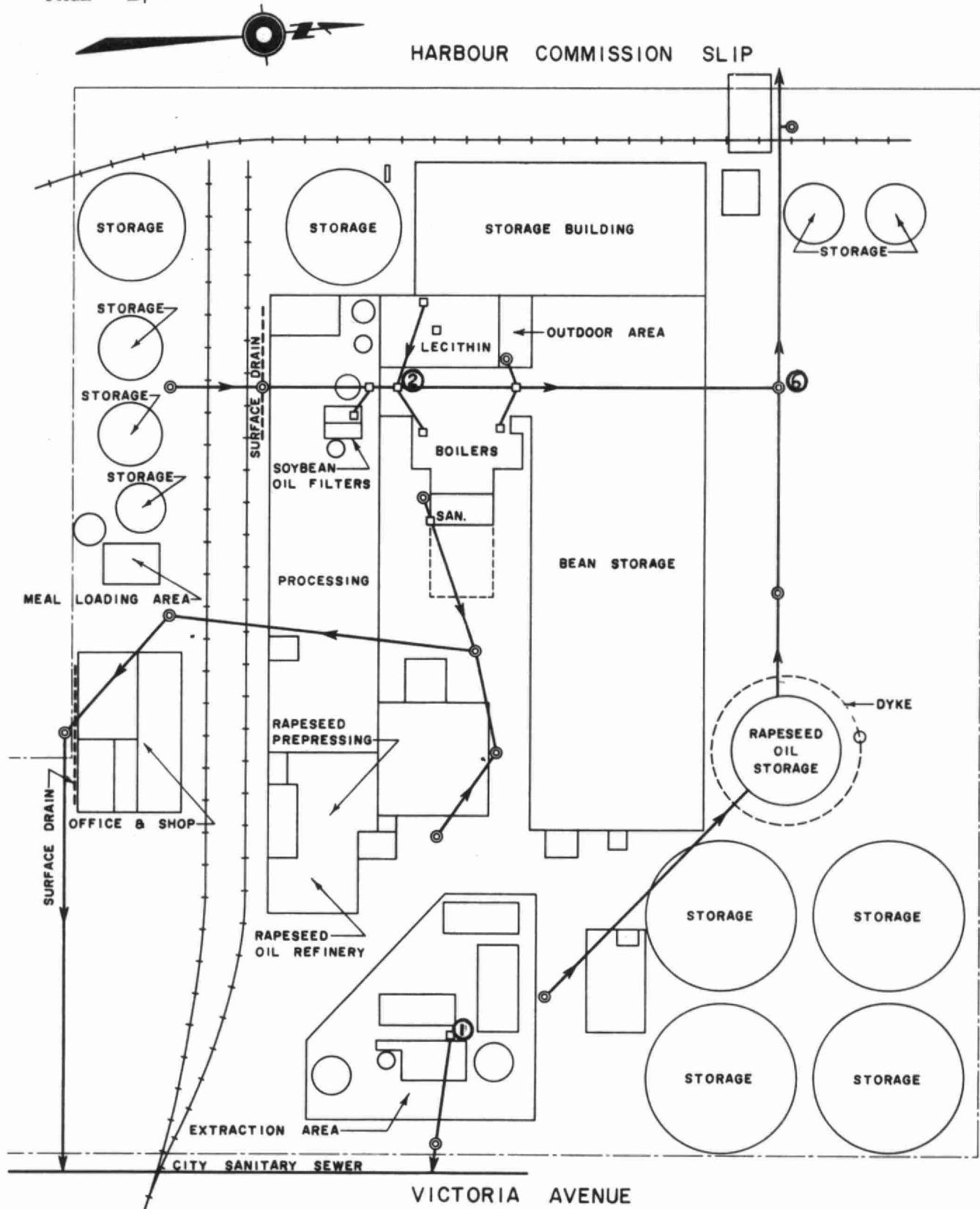
Waste loadings from the refinery area to Hamilton Bay were calculated using the flow figure of 35 gallons per minute, or 50,400 gallons per day. The sample analyses used to calculate the waste loading was that of the grab sample of the final effluent to Hamilton Bay.

WASTE	Flow IGPD	Suspended			
		Solids ppm	BOD lbs/day.	BOD ppm	Ether Solubles lbs/day
Final effluent into Hamilton Bay	50,400	40	20.2	24	12.1 9 4.55

DISCUSSION

During the survey several piles of decaying soybean stock were observed in various areas on the plant premises. Also, general refuse and scattered soybean stock covered the ground near the Harbour Commission Slip. Much of this material could enter the Slip by wind or other means. To improve this condition any spilt soybean stock or refuse should be collected and disposed of in a suitable manner. Stockpiling of soybean stock near the Slip should be avoided to prevent the spillage of material into the Slip. The rail car unloading of the stock causes much spillage of material and unloading collection facilities should therefore be improved.

Refinery process water, storm drains and barometric leg condenser effluents, which all discharge into the Harbour Commission Slip, were composite sampled at a sump shown on the diagram "Proposed Rapeseed Plant Layout" on page 17 as sample point 2. Difficulty was experienced in collecting the sample at this point

LEGEND

- - OUTSIDE SURFACE DRAIN
- - SUMP
- - - RAILWAY SIDING
- - - SURFACE DRAINS
- ① - SAMPLE POINT
- ② - Sample Point
- ③ - Sample Point
- ④ - Sample Point
- ⑤ - Sample Point
- ⑥ - Sample Point

CANADIAN VEGETABLE
OIL PROCESSING
HAMILTON ONTARIO
"PROPOSED RAPESEED PLANT LAYOUT"

due to floating grease in the sump. For this reason the analytical results were felt to be high for sample 2 and the results of the grab sample taken at point 6 on the diagram were used to calculate waste loadings. Also, the grab sample at point 6 included all process water going into the Slip; whereas the sample taken at point 2 did not.

The wastes entering the Slip from the plant exceeded OWRC water quality objectives in the concentration of BOD₅ and Suspended Solids. The composite sample at point 2 exceeded these objectives in the concentration of Ether Solubles also. Only uncontaminated storm drainage water and cooling water should be directed to the Hamilton Harbour Commission Slip. The process water from the refinery area and barometric leg condenser should be redirected into the municipal sanitary sewer. Also, all the floor drains and the boiler blow-down should be rerouted to the sanitary sewer to ensure that all contaminated wastes from the plant are properly treated.

The process water from the solvent extraction area and the condenser water should continue to be discharged to the sanitary sewer.

CONCLUSIONS

The effluent from the plant into the Harbour Commission Slip exceeds OWRC water quality objectives and is therefore unacceptable for discharge to a water-course.

The housekeeping at the plant and the stock unloading facilities were found to be in need of improvement.

RECOMMENDATIONS

- In order to abate the present source of pollution, it is recommended that -
- (1) the Company reroute all plant drains that contain contaminated wastes to discharge into the municipal sanitary sewer or to sufficiently treat the wastes to render them acceptable for discharge to the Harbour Commission Slip. Discharge to the sanitary sewer will require approval from the City Engineer.
 - (2) the Company improve the housekeeping practices at the plant to prevent refuse from entering the Slip.

- (3) the Company improve stock unloading techniques and facilities (such as the installation of screens) to prevent spillage of stock into the Slip.
- (4) All oil tanks on the premises should have dykes or other retaining facilities to contain any oil that may be spilt due to tank rupture or other accidents.
- (5) Storm run-off draining to Hamilton Harbour via the in-plant sewer system will be contaminated because of the nature of the area drained. This run-off therefore must not be discharged to the Bay in its untreated state.

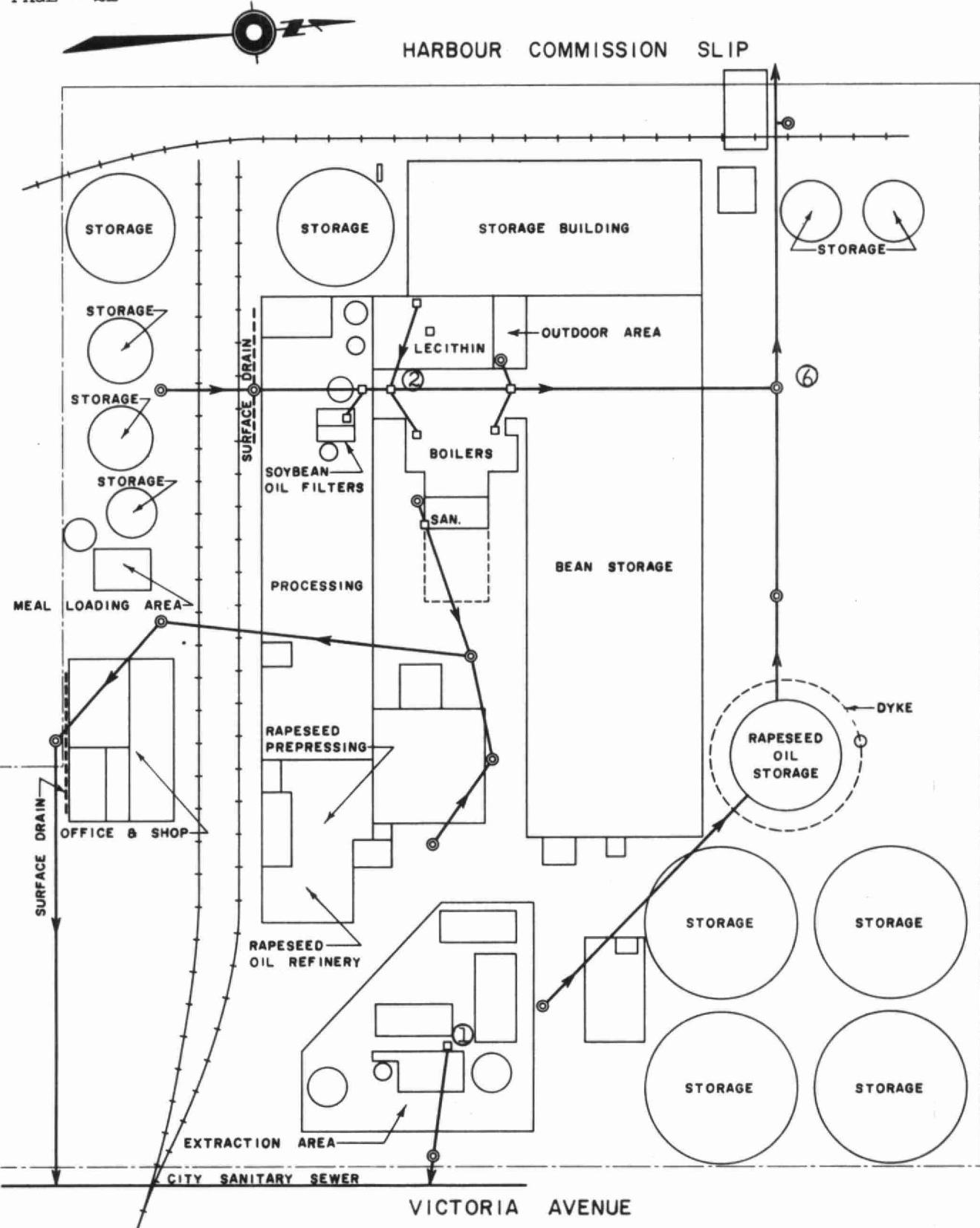
ONTARIO WATER RESOURCES COMMISSION
CHEMICAL LABORATORIES

analyses except pH reported in
p.p.m. unless otherwise indicated

INDUSTRIAL WASTE ANALYSIS

1 p.p.m. = 1 mgm. / litre
= 1 lb./100,000 Imp. Gals.

Municipality:	Hamilton	Report to:	G. Buxton	c.c.	b
Source:	Canadian Vegetable Oil Processing Limited				
Date Sampled:	20/7/71	by:	C. de la Riviere		
Lab. No.	5-Day B.O.D.	Solids	Phosphorus as P	pH at Lab.	Ether Solubles
		Total	Susp.	Diss.	
T29-61	120.	260	30	230	.20
T29-62	240.	780	190	590	7.0
T29-63	12.	340	5	335	.15
T29-64	16.	340	10	330	.15
T29-65	90.	350	30	320	.25
T29-66	24.	360	40	320	.75
T29-61	1.	Process water from solvent extraction - Composite 9:30a.m. - 4:00 p.m.			
T29-62	2.	Refinery process water, barometric leg condenser effluent & storm drains			
T29-63	3.	Condenser water to sump - Grab 11:00 a.m.			
T29-64	5.	Sump in extraction & condenser area - Grab 2:30 p.m.			
T29-65	6.	Final effluent into Hamilton Bay - Grab 4:10 p.m.			

LEGEND

- - OUTSIDE SURFACE DRAIN
- - SUMP
- - RAILWAY SIDING
- - - SURFACE DRAINS
- ① ② ⑥ - Sample Points

CANADIAN VEGETABLE
OIL PROCESSING
HAMILTON ONTARIO

"PROPOSED RAPESEED PLANT LAYOUT"

CANRON LIMITED (FOUNDRY DIVISION)

This industry was visited on July 20, 1971 and preliminary survey information was obtained from Mr. L. Huggett, Engineer. The plant was subsequently surveyed on July 22, 1971 when samples were obtained. The Plant Engineer is Mr. D. Hickling.

The plant is located on Burlington Street East at Kenilworth Avenue. The mailing address is P.O. Box 218, Hamilton.

DETAILS OF SURVEY

Personnel Interviewed

Mr. L. Huggett - Engineer

Personnel Participating

Mr. G. V. Buxton - OWRC

Mr. D. R. Ireland - OWRC

Description of Process

The process carried out is a typical foundry operation. Pig iron and scrap iron are received at the plant and melted down in a cupola. The iron is used to produce ingot moulds and sprue plates for use in the steel industry. The moulds weigh 15 to 25 tons each. Moulding sand and high silica sand are used to produce the moulds.

Operating Schedule

8 hours/day + a clean up shift

5 days/week

250 employees

Water Consumption and Distribution

All industrial and domestic water is obtained from the Hamilton Public Utilities Commission. The total plant consumption from April 1970 to April 1971, as obtained from the City of Hamilton, was 67,024,000 gallons. This is a daily consumption of approximately 269,000 gallons, based on a 250-day work year.

Sources of Liquid Waste and Disposal

The sources of liquid waste from this industry are as follows:

- (1) domestic wastes
- (2) overflow from the hotwell to the storm sewer
- (3) overflow from the slag quenching tank to the storm sewer.

The cupola outer wall is water cooled. The water enters a hot well and is recirculated, after traversing a cooling tower, with the overflow being directed to the storm sewer. City water is added as make-up at the top ring of the cupola.

Water is also used in a slag quenching tank with the overflow to the storm sewer. This water is not recirculated. The solids are settled out in the tank and removed by a mechanical sludge remover. The water overflow from this source is combined with the overflow from the hotwell. Water is also used to form the sand moulds but no waste is generated in this process.

All domestic wastes are discharged to the municipal sanitary sewer and all liquid industrial wastes are discharged to the storm sewer which enters the Kenilworth Slip.

There is no waste treatment provided at the plant except the removal of settled solids.

SAMPLING AND ANALYSIS

A grab sample of the overflow from the hot well and of the combined overflows of the hot well and slag quenching tank were obtained on July 22, 1971.

The samples were submitted to the OWRC laboratories for analysis in accordance with modifications to the procedures outlined in Standard Methods for the Analysis of Water and Wastewater, Twelfth Edition, an American Health Association publication.

STATEMENT OF RESULTS

The following waste loadings to the Kenilworth Slip were calculated using an average daily industrial water consumption of 250,000 gallons. The estimated

quantity of water used to form sand moulds and for domestic purposes is 19,000 gallons per day.

WASTE LOADINGS

Waste	Flow IGPD	Suspended Solids		Iron as FE		Phenols	
		ppm	lbs/day	ppm	lbs/day	ppm	lbs/day
Hot Well and Slag Tank Overflows	250,000	60	150	6.7	16.8	.002	.005
(Total Plant Discharge)							

DISCUSSION

The analytical results indicate that the majority of waste generated at the plant is from the slag quenching tank. The majority of the flow of water from the plant is also from the slag quenching tank.

The discharge from the hot well met OWRC objectives for discharge to a natural watercourse on the day of sampling. The combined discharge exceeded the OWRC objective of 15 ppm suspended solids. Thus, treatment for suspended solids removal should be provided for the slag tank overflow.

CONCLUSIONS

The total plant discharge exceeds the OWRC objective for suspended solids.

RECOMMENDATIONS

The effluent from the slag quenching tank should be properly treated through settling facilities.

ONTARIO WATER RESOURCES COMMISSION
CHEMICAL LABORATORIES

INDUSTRIAL WASTE ANALYSIS

All analyses except pH reported in
p.p.m. unless otherwise indicated

1 p.p.m. = 1 mgm. / litre
= 1 lb./100,000 Imp. Gals.

Municipality: Hamilton

Report to: G. Buxton

c.c.

Source: Canron Limited (Foundry Division)

Date Sampled: July 22/71 by: D. Ireland

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Lab. No.	5-Day B.O.D.	Solids			Iron as Fe		Phenols in ppb.	pH at Lab.				
		Total	Susp.	Diss.	Tot.	Diss.						
T29-164		270	10	260	0.08	-	2	7.5				
T29-165		440	60	380	6.7	-	2	7.7				

	T29-164	1.	Overflow from hot well to sewer	Grab 11:20 a.m.	
	T29-165	2.	Combined overflow of hot well and slag quenching tank at ^{se} /wer	- Grab 11:30 a.m.	

CHIPMAN CHEMICALS LTD.

This industry which occupies one section of the C-I-L plant was visited on July 28, 1971.

Mr. I. R. Warr, Production Superintendent and Works Engineer, provided information concerning processing and waste disposal practices.

There are no floor drains nor liquid wastes generated by this blending operation; hence, no samples were collected.

CITIES SERVICE CHEMICALS LTD. (COLUMBIAN DIVISION)

This industry, formerly named Columbian Carbon (Canada) Limited, was visited on July 28, 1971 and preliminary survey information was obtained from Mr. H. C. Sanders, Plant Manager. The plant was subsequently surveyed on July 30, 1971 when samples were obtained.

The plant is located at 755 Parkdale Avenue North in Hamilton. The mailing address is P.O. Box 3398, Station C, Hamilton.

DETAILS OF SURVEY

Personnel Interviewed

Mr. H. C. Sanders Jr. - Plant Manager

Personnel Participating

Mr. G. V. Buxton - OWRC

Mr. D. R. Ireland - OWRC

Description of Process

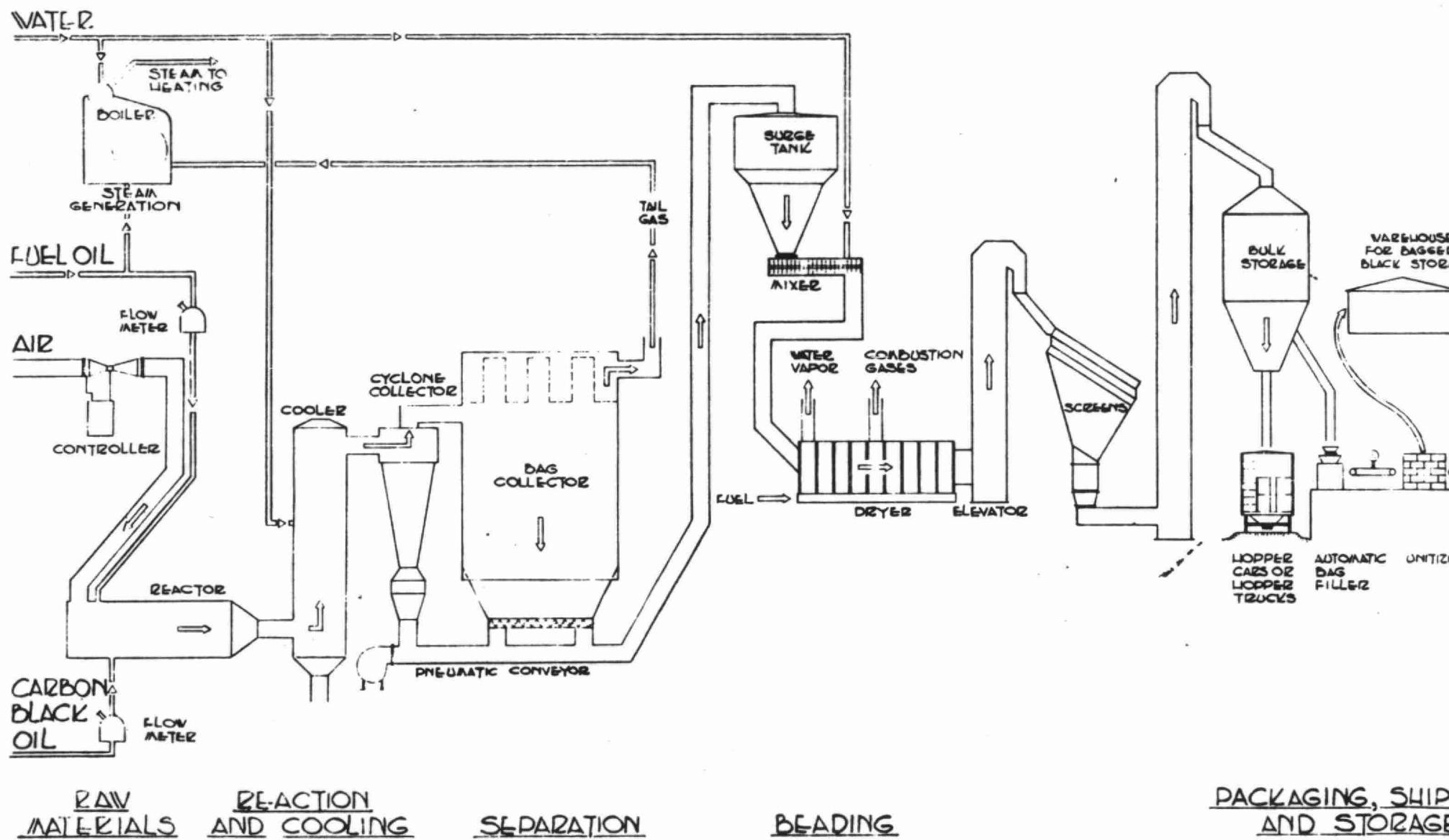
See the process diagram "Figure 1" on page 28.

The raw material for the process is carbon black oil, which is bottoms from oil refining processes. The oil is preheated in a direct-fired or heat exchange heater and atomized into a reactor in which gas or fuel oil and air are burned to provide the heat necessary to crack the aromatic oil. The temperature in the reactor is maintained in the range of 2,400 to 2,900° F by controlling the flow rates. The oil is cracked to carbon and hydrogen with side reactions producing carbon dioxide, carbon monoxide and water. Trace amounts of acetylene and methane are also produced.

The carbon laden gases are cooled to about 1000° F by direct water sprays in the quench section of the reactor. The water is lost as steam. The mixture is further cooled by heat exchange with the process air before entering a header leading to the collection system.

The cooled reaction mixture passes into a cyclonic collector-agglomerator and then to a bag filter in which glass fabric bags remove essentially all of the carbon black. The gaseous effluent is either vented to the atmosphere or used as a fuel for the boiler.

FIGURE I
COLUABIAN CARBON (CANADA) LTD.
HAMILTON PLANT



Carbon black is continually discharged from the collection equipment by valves into a pneumatic conveyor and subsequently collected into another cyclone. The pulverized black is conveyed to a pelletizing system where it is mixed with an equal weight of water. The mixture is agitated in a pin mixer and the resultant pellets are dried.

The product, several grades of furnace carbon black, is shipped in bulk hopper cars or 50 pound bags.

Operating Schedule

24 hours/day

7 days/week

115 employees

Water Consumption and Distribution

All industrial and domestic water is obtained from the Hamilton Public Utilities Commission.

The total water consumption at the plant for the year 1970, as obtained from the Hamilton City Hall, was 123,732,000 gallons. This is an average daily usage of 338,900 gallons, based on a 365 day working year. All of this water, except that used for domestic purposes, is eventually vented to the atmosphere as steam.

The water is used for cooling and equipment washing and is collected in a sump and re-used as cooling water and in the pelletizing system. The water from pelletizing is vented as steam. There is no discharge to any sewer.

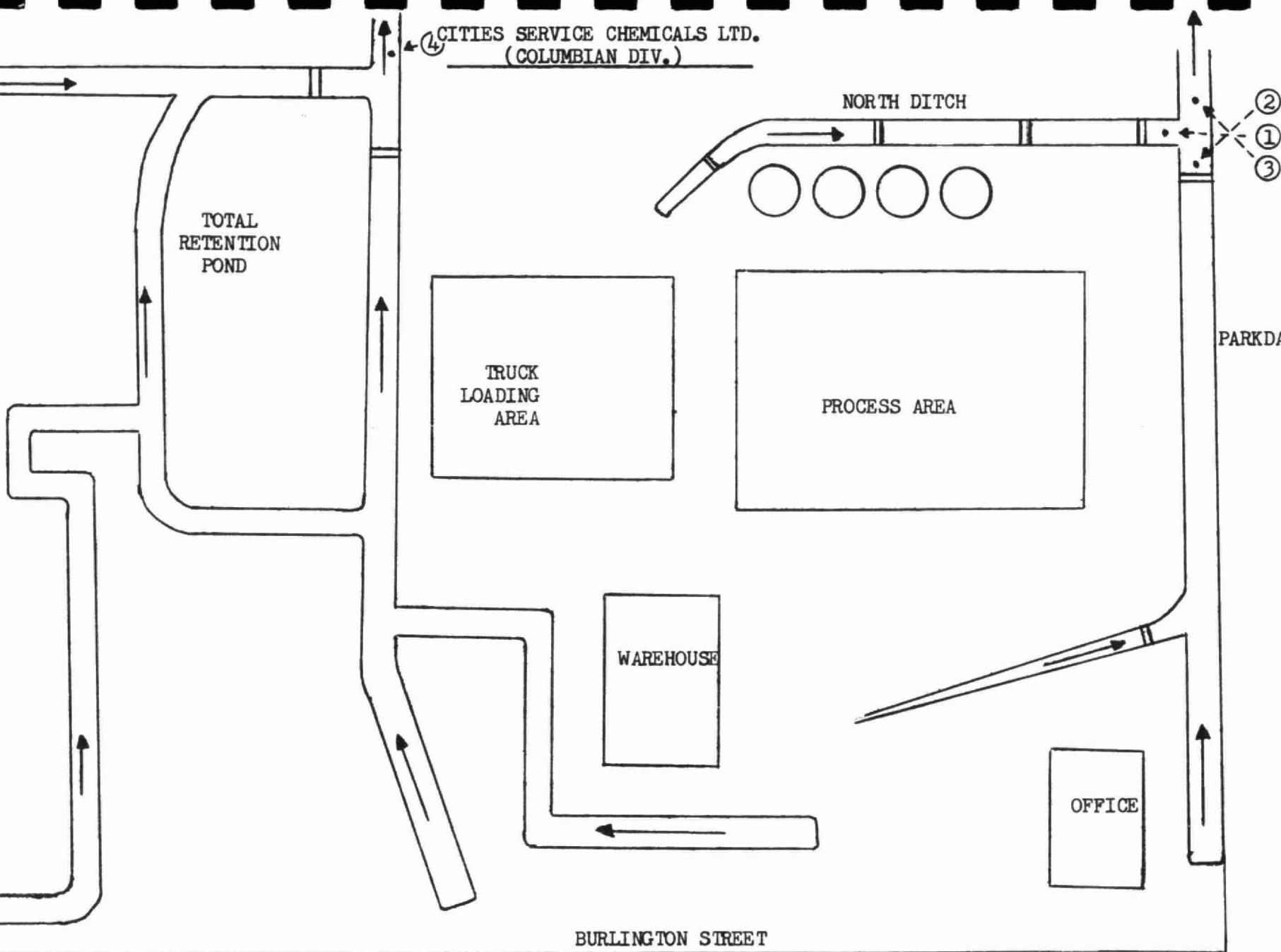
Sources of Liquid Waste and Disposal

All domestic wastes are discharged to the municipal sanitary sewer. There are no regular industrial waste flows from the plant. The water in the collection sump is re-used.

The solids in the collection sump are discharged to a total retention pond at the west end of the plant property.

There are several storm ditches which drain the plant property. These are shown on the sketch on page 30. These ditches normally carry only rain water, surface ground water and an underground spring water. If there is an occasional accidental overflow of the water collection sump, it enters these storm ditches.

CITIES SERVICE CHEMICALS LTD.
(COLUMBIAN DIV.)



1. North ditch downstream of stag filter beds
2. Parkdale Ave. ditch contents
3. Combined effluent of North and Parkdale Ave. ditch
4. Combined effluent of ditches in west end of the plant

The ditches discharge into the Bay. All of the ditches contain several slag filter dams to remove any solids entrained in the flow in the ditches.

SAMPLING AND ANALYSES

The following grab samples were obtained on July 30, 1971 -

- (1) North Ditch downstream of Slag Filter Beds
- (2) Parkdale Avenue Ditch contents
- (3) Combined effluent of North and Parkdale Avenue Ditches.

A grab sample of the combined effluent from the ditches of the west end of the plant was not obtained since the flow was negligible and appeared uncontaminated.

The samples were submitted to the OWRC laboratories for analysis in accordance with modifications to the procedures outlined in Standard Methods for the Examination of Water and Wastewater, Twelfth Edition, an American Health Association publication.

DISCUSSION

The majority of the flow in the storm ditches surrounding the plant was in the North Ditch. This flow was acceptable for discharge to a natural watercourse.

The majority of the waste loading to the Bay from the plant is from the Parkdale Avenue Ditch which had a suspended solids concentration of 45 ppm. The volume of flow in this ditch was very little but did increase the combined effluent concentration of suspended solids to 20 ppm, which exceeded OWRC objectives.

CONCLUSIONS

The slag filter beds in the North Ditch successfully treated the contents of the ditch to meet OWRC objectives for discharge to a natural watercourse.

The Parkdale Avenue Ditch is the major source of waste loading from the plant.

RECOMMENDATIONS

The present slag filter beds in the Parkdale Avenue Ditch should be replaced and additional filter beds should be provided to ensure an acceptable effluent quality.

ONTARIO WATER RESOURCES COMMISSION
CHEMICAL LABORATORIES

All analyses except pH reported in
p.p.m. unless otherwise indicated

INDUSTRIAL WASTE ANALYSIS

1 p.p.m. = 1 mgm. / litre
= 1 lb./100,000 Imp. Gals.

Municipality:	Hamilton	Report to:	G.V. Buxton Industrial Wastes Division	c.c.	/rd
Source:	Cities Service Chemicals Limited (Columbian Division)				
Date Sampled:	July 30/71	by:	D.R. Ireland		

Lab. No.	5-Day B.O.D.	Solids			pH at Lab.	C.O.D.						
		Total	Susp.	Diss.								
T31-1		340	5	335	7.7	< 30						
T31-2		390	45	345	7.9	< 30						
T31-3		380	20	360	8.0	< 30						

T31-1	1.	North Ditch Downstream of Slag Filter Beds - Grab 9:55 A.M.
T31-2	2.	Parkdale Avenue Ditch Contents - Grab 9:55 A.M.
T31-3	3.	Combined Effluent of North & Parkdale Ave. Ditches - Grab 10:00 A.M.

DOMTAR CHEMICALS LIMITED

The company is engaged in the production of aromatic oils from coking oven residue. The plant is located at 725 Strathearne Avenue, Hamilton.

DETAILS OF SURVEY

Domtar Chemicals Limited was visited on July 28, 1971 and sampled on July 30, 1971 from 0930 hr. to 1530 hr.

Personnel Interviewed

Mr. N. Millward	- Production Superintendent
Mr. D. Bannister	- Technician

Personnel Participating

Mr. G. V. Buxton	- OWRC
Mr. D. R. Ireland	- OWRC
Mr. J.C. de la Riviere	- OWRC

Description of Process

The company is engaged in the refining of aromatic oils from coking oven residues. The products are creosote, naphthalene oils, light oils, and acid oils. The residue is coal tar pitch. The coking residue is fractionally distilled and each product is collected. The products are condensed and stored in large reservoirs on the premises prior to shipment.

Production and Operating Data

The company is in operation 24 hours a day, 7 days a week, employing 38 people. The raw material feed rate is approximately 40 to 50 gallons per minute.

Water Consumption

The City of Hamilton supplies water to the site at a rate of 115,000 GPD. The consumption from April 1970 to April 1971 was 35,600,000 gallons.

Sources of Liquid Wastes, Treatment and Disposal

All domestic wastes are directed to the sanitary sewer.

Most industrial wastes are treated prior to entering a storm sewer which discharges ultimately to Hamilton Bay.

The raw material, coal tars, are appreciably moisture laden. The moisture is removed by distillation and decantation. These waste waters are directed to the treatment facilities. The stripping steam condensate is likewise directed to the treatment facilities.

The cooling water bleed-off discharges continuously to the treatment facilities. A fresh water make-up is continuously added. The boiler condensate and the barometric leg condenser effluent as well as the dehydration column condenser all receive treatment prior to discharging to the Bay sewer. The treatment facilities include settling, skimming, biological oxidation and clarification for the destruction and removal of phenolic compounds.

The condenser water normally by-passes the treatment facilities, but at the time of the survey this water was discharged into the treatment facilities.

Run-off water on the site may also enter the treatment facilities, but most enters the land drains and flows out by way of the south sewer.

SAMPLING AND ANALYSIS

The following grab samples were collected on July 30, 1971:

- 1) Effluent from the phenol treatment facilities - 1105 hrs.
- 2) Influent to aeration tank, - 1110 hrs.
- 3) Contents of aeration tank - 1135 hrs.
- 4) Influent to phenol treatment facilities - 1140 hrs.

The following grab sample was collected on August 11, 1971:

- 5) Steam condensate to storm sewer -- 1450 hrs.

Composite samples were collected at half-hour intervals over a six-hour period on July 30, 1971:

- 1) Total plant effluent to storm sewer, 0930 hrs. to 1530 hrs.
- 2) South plant sewer (untreated), 0930 hrs. to 1530 hrs.

ANALYTICAL RESULTS

The analytical results are appended to this report.

WASTE LOADING

The waste loadings from the plant to the storm sewer which discharges into Hamilton Bay were calculated using the average daily flow figure of 115,000 gallons per day.

Waste	Flow MGPD	Suspended Solids		BOD ₅		Phenols		Total Kjeldahl as N	
		ppm	lbs/day	ppm	lbs/day	ppm	lbs/day	ppm	lbs/day
Total Plant Effluent to Storm Sewer	115,000	30	34.5	36	41.5	7.5	8.6	27	31

DISCUSSION

The OWRC water quality objectives for discharge to a storm sewer or natural watercourse are as follows:

BOD₅ 15 ppm
Suspended Solids 15 ppm
Ether Solubles 15 ppm
Phenolic Compounds 20 ppb (parts per billion)
pH 5.5 to 9.5

The steam condensate that is presently directed to the storm sewer without treatment exceeded OWRC objectives for BOD₅ and phenolic compounds. The quantity of Ether Solubles could also be in excess of OWRC objectives, but due to analytical problems, the concentration was reported as "greater than 12 ppm". This waste flow should be directed through the treatment facilities before it is discharged to a storm sewer.

The contents of the south plant sewer had a pH of 9.8 which was slightly in excess of OWRC objectives. All other waste flows also had high pH values although they were within objectives, such as the total plant effluent which had a pH of 9.2. Adjustment of pH may at times be necessary to meet OWRC objectives.

The south plant sewer also contained a high concentration of phenolic compounds at 500 ppb. This concentration exceeds OWRC objectives for discharge to a storm sewer and should be treated before discharge.

The influent to the phenol treatment facilities contained high concentrations of BOD_5 , COD, Suspended Solids and Phenolic Compounds. Phenolic Compounds were especially high at 50,000 ppb. The effluent from the treatment facilities was also very high in concentration for the same constituents although all concentrations were reduced from 89% for COD (4200 to 465 ppm) to as little as 17% (240 to 200 ppm) for BOD_5 . The concentration of Phenolic Compounds was reduced from 50,000 ppb to 10,000 ppb, which was still greatly in excess of OWRC objectives.

The final plant effluent to the storm sewer after dilution with the contents of the south plant sewer was still in excess of OWRC objectives for BOD_5 , Suspended Solids and especially Phenols at 7,500 ppb, which is 375 times the acceptable concentration for discharge to a storm sewer.

CONCLUSIONS

The concentrations of BOD_5 , Suspended Solids and especially Phenolic Compounds in the total plant effluent to the storm sewer were in excess of OWRC water quality objectives and is thus, unacceptable for discharge to a storm sewer or watercourse.

The waste streams of the south plant sewer and the steam condensate contained high concentrations of Phenolic Compounds and did not receive any treatment for their destruction before discharge.

The degree of treatment provided by the waste treatment facility was inadequate.

RECOMMENDATIONS

To abate the source of water pollution from this plant it is recommended that:

- (1) The Company hire a consulting engineering firm to design an efficient waste treatment facility capable of treating all plant wastes to render them acceptable for discharge to a storm sewer, and that the Company construct this facility as soon as possible,
- (2) All process waste streams that contain concentrations of waste constituents in excess of OWRC objectives should be directed through the treatment facility.
- (3) An alternative treatment scheme would be to pretreat the waste to a level where they would be acceptable for discharge to the municipal sanitary sewer. This possibility would require the approval of the City Engineer.

ONTARIO WATER RESOURCES COMMISSION
CHEMICAL LABORATORIES

All analyses except pH reported in
p.p.m. unless otherwise indicated

INDUSTRIAL WASTE ANALYSIS

1 p.p.m. = 1 mgm. / litre
= 1 lb./100,000 Imp. Gals.

Municipality:	Hamilton		Report to:	G.V. Buxton - P. Eng.		c.c.	/rd
Source:	Domtar Chemicals Limited		Industrial Wastes Division				
Date Sampled:	30/7/71		by:	J.C. de la Riviere			
Lab. No.	5-Day B.O.D.	Solids			C.O.D.	pH at Lab.	Phenols in ppb
		Total	Susp.	Diss.			Phosphorus as P.
T31-5	36.	460	30	430	70	9.2	7500
T31-6	200.	1280	200	1080	465	8.2	10000
T31-7	3000	880	390	490	4700	9.3	50000
T31-8	150.	4680	3710	970	5600	8.3	15000
T31-9	240.	830	640	190	4200	8.3	50000
T31-10	11.	400	5	395	< 30	9.8	500
* Aqueous layer of sample only							
T31-5	1.	Total Plant Effluent to Storm Sewer - 1/2 hour Composite 9:30 - 3:30 P.M.					* Duplicate.
T31-6	2.	Effluent from phenol treatment facilities - Grab 11:05 A.M. -					* Duplicate.
T31-7	3.	Influent to Aeration Tank - Grab 11:10 A.M. -					* Duplicate.
T31-8	4.	Contents of Aeration Tank - Grab 11:35 A.M. -					Duplicate
T31-9	5.	Influent to Phenol Treatment Facilities - Grab 11:40 A.M. -					* Duplicate.
T31-10	6.	South Plant Sewer (Untreated) - 1/2 Hour Composite 9:30 - 3:30 P.M. -					* Duplicate.

INTERNATIONAL HARVESTER COMPANY OF CANADA LTD.

This industry was visited on July 19, 1971 and preliminary survey information was obtained. The plant is located at 208 Hillyard Street, Hamilton.

DETAILS OF SURVEY

Personnel Interviewed

Mr. G. Mahon	- Project Planning Engineer
Mr. H. Sproule	- Plant Engineer
Mr. J. Adamczack	- Assistant Plant Engineer

Personnel Participating

Mr. G. V. Buxton	- OWRC
Mr. D. R. Ireland	- OWRC
Mr. J. C. de la Riviere	- OWRC

Because of a labour strike, this survey could not be completed.

A sampling program will be conducted at a later date.

Samples from the International Harvester main sewer have been collected in conjunction with the sampling programmes at the Steel Company of Canada (1970 and 1971).

The analytical results of these samples indicate waste constituent concentration ranges as follows:

Ammonia	- (0-3) ppm	Cyanide	- (0 -.09) ppm
COD	- (23 - 235) ppm	Iron	- (0 - 7) ppm
Phenolic compounds	- (0 - 31) ppb	Oil	- (4 - 167) ppm
Suspended Solids	- (2 - 120) ppm		

These results indicate that a problem may exist with regard to oils, phenols and suspended solids and that this effluent may require treatment to be acceptable for discharge to the storm sewer.

JERVIS B. WEBB CO. OF CANADA LTD.

This company was visited July 28, 1971. The company is located at 1647 Burlington St. East and is engaged in the manufacture of conveyor systems.

DETAILS OF SURVEY

Personnel Interviewed

Mr. A. St. Pierre - Plant Foreman

Personnel Participating

Mr. J. C. de la Riviere- OWRC

Description of Process

The company conducts metal fabrication work. This involves the manufacture of conveyor systems from primary steel products -- i.e. angles, pipes, tubes, sheet metal, rods etc. The operations performed include welding, bending, cutting, drilling and other metal working and machining.

All products are painted (primer coat only) on the premises.

Water Consumption

In the year 1970 the company used 595,000 gallons of water, all supplied by the City of Hamilton.

Sources of Liquid Wastes, Treatment and Disposal

Cutting oils are used in the many types of machinery used by the company, but these oils are recycled.

The primer spray is thinned in varsol and dries readily and, thus, does not present a run-off or washup problem.

The roof drains into the sanitary sewer along with all domestic wastes.

All scrap metal is hauled off the premises by Waxman or Lex.

CONCLUSIONS

With the exception of misdirected roof drainage, there did not appear to be any pollution problems at this plant site at the time of this survey.

RECOMMENDATION

The uncontaminated roof drainage should be segregated and directed to the storm sewer and not the sanitary sewer.

KENT STEEL PRODUCTS LTD.

This company, located at 1835 Burlington St. East, was visited on July 28, 1971.

DETAILS OF SURVEY

Personnel Interviewed

Mr. A. Bernes - Plant Manager

Personnel Participating

Mr. J. C. de la Riviere - OWRC

Description of Processes

Kent Steel Products is a sheet metal service centre. Coils of sheeted steel are custom cut for further processing by customers. The coils are flattened, cut and packaged.

Production and Operating Data

Production is related to the type of service performed by the company. No meaningful figure, i.e. tons per day etc., could be applied.

The company employs from 145 to 200 people. It operates 18 hours per day, 6, and sometimes 7, days per week.

Water Consumption and Distribution

All water on the premises is used for domestic purposes. In the year 1970 the water used amounted to 2.5 million gallons, all supplied by the City of Hamilton.

Sources of Liquid Wastes, Treatment and Disposal

The company maintains a fleet of transport trucks, but all servicing and washing is done at an independent service station, so no waste is generated from their presence.

Oil, from the steel rolls, was noticed on the storage area floor, but sawdust and oil absorber were spread to absorb it.

All scrap metal and wastes are trucked from the premises by an industrial wastes disposal company.

CONCLUSIONS

This company appears to be a dry industry and thus does not pose a pollution problem.

RECOMMENDATIONS

No recommendations will be made at this time.

McLAREN'S FOODS LTD.

This industry was visited on July 20, 1971 and survey information was obtained from Mr. H. DeJong, Plant Engineer.

The plant is located at 1721 Burlington Street East in Hamilton. The mailing address is P.O. Box 3400, Station C, Hamilton.

DETAILS OF SURVEY

Personnel Interviewed

Mr. H. DeJong - Plant Engineer

Personnel Participating

Mr. G. V. Buxton - OWRC

Mr. D. R. Ireland - OWRC

Description of Process

This is a food processing industry. The raw materials received at the plant are unprocessed cucumbers, olives in brine solution, cherries in preservative, onions in a vinegar preservative, dried peanuts in bags, chopped and dried peppers, liquid sugar, calcium, alum, etc.

The cucumbers are washed, cut and jarred in a brine solution. The peanuts are roasted and crushed and mixed with other ingredients to produce peanut butter. The cherries, onions and olives are washed and packaged.

The products are pickles, relish, peanut butter, onions, maraschino cherries, olives and salad dressing.

Operating Schedule

8 to 16 hours/day (one or two shifts)

5 days/week

130-160 employees (at peak 200)

Water Consumption and Distribution

All industrial and domestic water is obtained from the Hamilton Public Utilities Commission.

The total water consumption for the plant from April 1970 to April 1971, as obtained from the City of Hamilton was 31,451,000 gallons.

This is an average daily consumption of approximately 126,000 gallons, based on a 250-day working year.

Sources of Liquid Wastes and Disposal

All wastes from the plant, both industrial and domestic, are discharged to the municipal sanitary sewer system of Hamilton. These wastes would be mainly raw materials wash waters. The wash waters are untreated except for trap screens to remove solid pieces of material. The wash waters would contain the preservatives that the raw materials are received in.

There are no discharges from the plant to a storm sewer.

SAMPLING AND ANALYSIS

No samples were collected at this plant.

CONCLUSIONS

The quality of wastes generated at this plant and discharged to the sanitary sewer are under the jurisdiction of the City of Hamilton.

RECOMMENDATIONS

No recommendations will be made.

M & T PRODUCTS OF CANADA LTD.

This industry was visited on July 20, 1971 and preliminary survey information was obtained from Mr. E. D. Rogers, Plant Manager. The plant was subsequently sampled on July 22, 1971.

The plant is located at 670 Strathearne Avenue North in Hamilton. The mailing address is P.O. Box 3070, Station C, Hamilton.

DETAILS OF SURVEY

Personnel Interviewed

Mr. E. D. Rogers - Plant Manager

Personnel Participating

Mr. G. V. Buxton - OWRC

Mr. D. R. Ireland - OWRC

Description of Process

The plant carries out four types of processing. They are (1) the reclamation of tin from scrap, (2) the production of tin bearing chemicals, (3) the production of organic chemicals and coatings and (4) the production of electroplating chemicals and supplies.

For the reclamation of tin, tin bearing scrap is received at the plant and is treated in rotating drums in a solution of 20% NaOH, 3% NaNO₃ and water at 200° F to remove the tin and lacquer finish. This produces sodium stannate Na₂Sn(OH)₃ and phenolics. The tin-free steel is crushed into bales and sold to the steel companies. The sodium stannate crystals are filtered out of solution and are washed with water and then processed into potassium stannate as a finished product.

The washings can be either alkaline or acidic depending on whether they contain, respectively, NaOH, NaCO₃ and organics or NaSO₃. The washings are directed to a trap tank where the tin bearing insolubles, such as tin hydrate, are settled out and recovered and the liquid is discharged to the storm sewer.

Some of the raw materials used in the production of organic chemicals and coatings are: toluol, zylol, methyl ethyl ketone, cellosolv acetate and di-octyl phthalate. The coatings and chemicals are produced batchwise with no possible

chance of the chemicals getting to a sewer since there is no drainage from this area. All spills are collected and sent out to be processed into cleaning solvents.

In the electroplating chemicals and supplies area, plating chemicals, cleaners and buffing compounds are produced. The cleaners are sold to be used to clean metals prior to electroplating and are formed from such chemicals as boric acid, sodium hydroxide and surfactants. The buffing compounds are composed of abrasive materials such as silica and aluminium oxide which are kept in suspension by greases such as steric acid, tallow or petrolatum. Electroplating products consisting of chromium, copper and nickel-bearing solutions and compounds are also produced at the plant. These products are produced batchwise and the equipment washings are directed to two trenches which discharge to the sanitary sewer. Contaminated chrome wastes are treated before discharge and the chrome sludge is buried.

Operating Schedule

8 hours/day (de-tinning 24 hrs/day)

5 days/week

74 employees

Water Consumption and Distribution

All industrial and domestic water is obtained from the Hamilton Public Utilities Commission.

Personnel of the company have estimated that they will use 12,000,000 gallons for the year 1971, or one million gallons per month. The following is a summation of monthly water consumption and point of discharge:

Use	Quantity gals/month	Storm Sewer	Sanitary Sewer
Process Water (platings)	100,000		X
Cleaning & Wash down in Nickel brighteners	10,000		X
Waste treating (Chrome washings)	10,000		X
Soft Process water	8,000		X
Hard Cooling water	10,000		X

Use	Quantity gals/month	Storm Sewer	Sanitary Sewer
Domestic	112,000		X
Lawn watering	5,000	to ground	
Boiler water	35,000	X	
Laboratories	185,000		X
Cooling water	140,000	X	
Water to top up tanks & Wash down pump water	200,000	evaporated	
Soft Process water	170,000	X	
Cooling Coil water	15,000	X	
	<hr/>	<hr/>	<hr/>
	1,000,000	360,000	435,000

Sources of Liquid Waste and Disposal

The sources of liquid wastes at this industry are as follows:

- (1) domestic wastes
- (2) cooling water
- (3) boiler blowdown
- (4) laboratory wastes
- (5) wastes from washings of electroplating chemicals and supplies area
- (6) washings of tin hydrate from the de-tinning process
- (7) effluent from the potassium stannate process.

All domestic wastes, laboratory wastes and plating wastes are discharged to the sanitary sewer. A portion of the cooling water (10,000 gallons) is also discharged to the sanitary sewer. The remaining cooling water, the boiler blow-down, the washings from the de-tinning process and the effluent from the potassium stannate process are all discharged to the storm sewer

The washings from the de-tinning process first have the tin hydrate settled out in a trap tank, and then the supernatant is discharged to the storm sewer along with the roof drainage. The effluent from the potassium stannate process is first discharged to a settling pond where the unrecoverable tin bearing solids settle out and the overflow enters a ditch which leads off the property to the storm sewer.

The settled muds are dredged from the pond and permitted to dry in an adjacent holding area. Every few years the mud is dredged from the drying area and sent to Texas to be smelted to recover the tin.

SAMPLING AND ANALYSIS

Grab samples were obtained of the effluent from the trap tank to the storm sewer and of the effluent from the settling pond to the storm sewer via the ditch. These samples were submitted to the OWRC laboratories for analysis in accordance with modifications of the procedures outlined in Standard Methods for the Analysis of Water and Wastewater, Twelfth Edition, an American Health Association publication.

STATEMENT OF RESULTS

WASTE LOADINGS

Waste	Flow IGPD	BOD ₅ ppm	Suspended Solids ppm	Tin as Sn ppm	Phenols ppm	Alkalinity as CaCO ₃ ppm	
Lagoon Effluent to Storm Sewer	3,500	3200	112.0	240 8.4	2.3 0.08	.6 0.02	37,080 1298
Overflow from Trap Tank to Storm Sewer	5,000	3400	170.0	1560 78.0	2.24 0.11	1.5 0.075	61,400 3070

The waste loadings were calculated based on the flow figures of 70,000 gallons per month effluent from the lagoon and 100,000 gallons per month effluent from the trap tank. These figures were provided by company personnel.

DISCUSSION

During this survey no samples of wastes discharged to the municipal sanitary sewer were obtained. For this reason no conclusions can be made concerning the quality of these wastes.

Both of the plant discharges to the storm sewer, the lagoon effluent and the overflow from the trap tank, exceeded OWRC objectives for discharge to a storm sewer in concentration of BOD₅, SOLIDS, TIN, pH and PHENOLS. The company should consider hiring a consulting engineering firm to assess the feasibility of

treating these wastes for BOD_5 and Phenols in conjunction with heavy metals, and to design such a treatment facility.

The company should also decide whether to treat the wastes for discharge to (1) a storm sewer, (2) the municipal sanitary sewer or (3) to negotiate with the City for permission to discharge wastes exceeding the municipal sewer-use by-law limitations. The maximum concentrations of BOD_5 , Phenols and Tin allowable for discharge to a storm sewer are 15 ppm, 0.02 ppm and 1 ppm respectively.

The allowable concentrations of BOD_5 , Phenols and Tin which may be discharged to the sanitary sewer can be obtained from the Hamilton sewer-use by-law. The redirection of any waste flows to the sanitary sewer will require permission from the City Engineer.

CONCLUSIONS

The effluents from the lagoon and the trap tank both exceeded OWRC water quality objectives and were thus unacceptable for discharge.

RECOMMENDATIONS

The company should decide which of the treatment alternatives it will utilize to satisfactorily treat the effluents from the lagoon and trap tank.

ONTARIO WATER RESOURCES COMMISSION
CHEMICAL LABORATORIES

All analyses except pH reported in
p.p.m. unless otherwise indicated

INDUSTRIAL WASTE ANALYSIS

1 p.p.m. = 1 mgm. / litre
= 1 lb./100,000 Imp. Gals.

c.c.

Municipality: Hamilton

Report to: G.V. Tuxton (Ind. Waste)

Source: E&T Products of Canada Ltd.

Date Sampled: July 22/71 by: D.R. Ireland

(rj)

Lab. No.	5-Day B.O.D.	Solids			pH at Lab.	Tin as Sn.	Alkalinity as CaCO ₃	Phenols in ppb	Colour Dilution			
		Total	Susp.	Diss.								
T29-156	3200	53,180	240	52,940	9.8	---	37,080	600	1:10,000			
T29-157	3400	89,160	1560	87,600	9.8	---	61,400	1500	1:8,000			
T29-158	---	---	---	---	---	2.3	---	---	---			
T29-159	---	---	---	---	---	2.24	---	---	---			

T29-156	1	Lagoon effluent to Storm sewer	Grab 10.20 AM	Duplicate sample
T29-157	2	Overflow from Trap Tank to Storm sewer	Grab 10.10 AM	Duplicate Sample
T29-158	3	Lagoon Effluent to Storm sewer - Grab	10.25 AM	
T29-159	4	Overflow from Trap Tank to Storm sewer	Grab 10.15 AM	

NATIONAL SLAG LIMITED

This industry was visited on July 30, 1971 at which time survey information was obtained from Mr. B. Cotsworth, Sales Engineer.

The plant is located at 139 Windermere Road in Hamilton.

DETAILS OF SURVEY

Personnel Interviewed

Mr. B. Cotsworth - Sales Engineer

Personnel Participating

Mr. D. R. Ireland - OWRC

Description of Process

The plant receives blast furnace slag from the steel companies in the area. Both air-cooled slag and expanded slag are processed.

The slag is crushed and screened to produce ten different sizes of aggregate. Two of the sizes are washed (3/4" and 3/8"). The company produces approximately one million tons per year of aggregate.

Operating Schedule

8 hours/day

5 days/week

35 employees (production employees)

Water Consumption and Distribution

Based on information received from the Hamilton Public Utilities Commission, the plant used 3,859,000 gallons from April 1970 to April 1971. This is an average daily consumption of approximately 15,000 gallons, based on a 250-day work year.

The only other water used is an unknown quantity of ground water collected in a pond on the plant property.

All water on the premises is used for aggregate washing, except that used for domestic purposes. The water is recirculated through the pond with P.U.C. make-up water

Sources of Liquid Waste and Disposal

All domestic wastes are discharged to a septic tank and field tile system.

The only industrial wastewater is from the washing operation and this is all recycled through the settling pond, with P.U.C. make-up water. There is no effluent from the settling pond to a sewer or to an open ditch. The pond is dredged twice each year.

SAMPLING AND ANALYSIS

No samples were collected at this plant.

CONCLUSIONS

There are no liquid industrial wastes discharged from this plant to a watercourse and thus no direct pollution problems were evident.

RECOMMENDATIONS

No recommendations will be made.

NATIONAL STEEL CAR CORPORATION LIMITED

This industry was visited on July 20, 1971 and preliminary survey information was obtained from Mr. Stan Greyba, Assistant Plant Engineer. The plant was subsequently surveyed on July 22, 1971 and July 28, 1971 when samples were collected.

The plant is located on Kenilworth Avenue North in Hamilton. The mailing address is P.O. Box 450, Hamilton. The Plant Engineer is Mr. H. Lloyd.

DETAILS OF SURVEY

Personnel Interviewed

Mr. S. Greyba	- Assistant Plant Engineer
Mr. H. Roberts	- Rod Foreman

Personnel Participating

Mr. G. V. Buxton	- OWRC
Mr. D. R. Ireland	- OWRC

Description of Process

The plant produces railway cars, rolling stock and industrial and mining type cars. The plant receives stock lengths of steel and rolled structural steel as the main raw materials used in the construction of the railway cars.

The processes carried out are shearing, pressing, burning, fabrication and welding, sand blasting, painting and assembly.

Operating Schedule

8 to 16 hours/day

5 days/week

1000 employees

Water Consumption and Distribution

All industrial and domestic water is obtained from the Hamilton Public Utilities Commission.

The total water consumption at the plant from April 1970 to April 1971, as obtained from the City of Hamilton was 33,179,000 gallons. This is an average of approximately 133,000 gallons per day, based on a 250-day working year.

Sources of Liquid Waste and Disposal

The sources of liquid waste at this industry are as follows:

- (1) domestic wastes
- (2) drinking fountain water
- (3) batch dumped paint spray booth water
- (4) continuous boiler blowdown
- (5) backwash from the zeolite water softener
- (6) cooling water from quench oil
- (7) cooling water from heat exchangers and compressors.

All domestic wastes are discharged to the municipal sanitary sewer and all industrial wastes are discharged to the Kenilworth Slip at five points.

The water from the paint spray booth water curtain is recirculated for a period of several days and is then batch dumped, untreated, to a storm sewer. All cooling water is also discharged to the Kenilworth Slip. The continuous boiler blowdown, periodic filter backwash and a periodic water softener backwash (1/2 hour every 2 or 3 days) are also discharged untreated to the Kenilworth Slip.

SAMPLING AND ANALYSIS

The following grab samples were obtained on July 22, 1971:

- (1) the continuous boiler blowdown, grab 1:25 p.m.
- (2) compressor cooling water discharge, grab 1:30 p.m.
- (3) north intermittent effluent, grab 1:40 p.m.

On July 28, 1971:

- (4) south intermittent discharge, grab 3:00 p.m.
- (5) contents of paint spray booth, grab 3:10 p.m.

SAMPLING AND ANALYSIS (continued)

On September 2, 1971:

(6) zeolite softener backwash, grab 10:00 a.m.

(7) water filter backwash, grab 10:00 a.m.

(8) discharge from lime blanket, grab 10:30 a.m.

These samples were submitted to the OWRC, Division of Laboratories, in Toronto, for analysis in accordance with the procedures outlined in Standard Methods for the Examination of Water and Wastewater, or modifications thereof. This is an American Health Association publication. The analytical results are appended.

DISCUSSION

The continuous boiler blowdown had a pH of 11.3 at the time of sampling. The OWRC objective for pH is 5.5 - 9.5. This effluent should be neutralized prior to discharge.

The compressor cooling water effluent, the north intermittent effluent and the south intermittent effluent were acceptable for discharge at the time of sampling. These effluents consist mainly of uncontaminated cooling water.

The paint spray booth dumps, which are batch discharges, were found to contain excessive concentrations of suspended solids, BOD₅ (Biochemical Oxygen Demand: this is a measure of the organic content in the waste stream) and ether soluble materials (oils). Whereas the volume of this waste is small, it is unsuitable for discharge to a watercourse. This stream could be redirected to the municipal sanitary sewer system. However, permission from the City Engineer will be required.

The zeolite softener backwash water, which is a periodic flow, contained excessive quantities of suspended solids and was thus unacceptable for discharge to a watercourse. This discharge could also be redirected to the municipal sanitary sewer system for treatment.

The water filter backwash and the discharge from the lime blanket both

contained excessive amounts of suspended solids. Both streams are unacceptable for discharge to a watercourse and could be redirected to the municipal sanitary sewer.

CONCLUSIONS

Of the eight waste streams sampled, only the following three discharges are acceptable for discharge to a watercourse:

- (1) the compressor cooling water effluent
- (2) the north intermittent effluent
- (3) the south intermittent effluent

The following five waste streams are unacceptable for discharge to a watercourse:

- (1) the continuous boiler blowdown
- (2) the paint spray booth discharge
- (3) the zeolite softener backwash
- (4) the water filter backwash
- (5) the discharge from the lime blanket

The five unacceptable streams constitute five direct contraventions of Section 27(1) of the OWRC Act.

RECOMMENDATIONS

With perhaps the exception of the discharge from the lime blanket, the unacceptable waste streams could receive adequate treatment at the municipal treatment plant. Company officials should contact the City Engineer to receive permission to redirect these waste streams to the sanitary sewer system.

The lime blanket discharge (50,000 ppm suspended solids) will require pretreatment (settling) prior to discharging to the sanitary sewer or a storm sewer. This discharge should also be discussed with the City Engineer.

ONTARIO WATER RESOURCES COMMISSION
CHEMICAL LABORATORIES

INDUSTRIAL WASTE ANALYSIS

All analyses except pH reported in
p.p.m. unless otherwise indicated

1 p.p.m. = 1 mgm. / litre
= 1 lb./100,000 Imp. Gals.

Municipality: Hamilton

Report to: G.V. Buxton, Div. of Ind. Wastes

c.c.

Source: National Steel Car Corp. Ltd.

Date Sampled: July 22/71 by: D.R.I.

mm

Lab. No.	5-Day B.O.D.	Solids			pH at Lab	Phenols in ppb	Iron as Fe	Total Calcium as Ca	Total Kjeldahl as N				
		Total	Susp.	Diss.									
T29-160		1700	5	1695	11.3	--	0.52	--	--				
T29-161		270	10	265	8.0	2	0.12	--	--				
T29-162		290	15	275	7.7	2	2.50	--	--				

T29-160	2	Continuous Boiler Blowdown	Grab 1.25 p.m.	Duplicate
T29-161	3	Compressor Cooling water discharge	Grab 1.30 p.m.	"
T29-162	5	North intermittent effluent	" 1.40 p.m.	"

ONTARIO WATER RESOURCES COMMISSION
CHEMICAL LABORATORIES

All analyses except pH reported in
p.p.m. unless otherwise indicated

INDUSTRIAL WASTE ANALYSIS

1 p.p.m. = 1 mgm. / litre
= 1 lb./100,000 Imp. Gals.

Municipality: Hamilton		Report to: G.V. Buxton		c.c.								
Source: National Steel Car Corp. Ltd.												
Date Sampled: July 28/71 by: D.R. Ireland									(r.j)			
Lab. No.	5-Day B.O.D.	Solids			COD	Phenols In pub	Other Solubles	pH at Lab.				
T30-24	7.0	Total 260	Susp. 5	Diss. 255	< 30	2	---	7.4				
T30-35	100.	Total 150	Susp. 130	Diss. 2020	670	15	20	8.7				
T30-24	1	South intermittent discharge - Grab 3.10 PM										
T30-35	6	Contents of Paint spray booths - Grab 3.10 PM										

ONTARIO WATER RESOURCES COMMISSION
CHEMICAL LABORATORIES

INDUSTRIAL WASTE ANALYSIS

*All analyses except pH reported in
p.p.m. unless otherwise indicated

1 p.p.m. = 1 mgm. / litre
= 1 lb./100,000 Imp. Gals.

c.c.

Municipality: Hamilton

Report to: G. Buxton

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Source: National Steel Car Corp. Ltd.

Date Sampled: Sept. 2/71 by: D. Ireland

b

Lab. No.	5-Day B.O.D.	Solids			pH at Lab.	Iron as Fe	Kjeldahl as N	Total Alkalinity as CaCO ₃	Total Calcium as Ca				
		Total	Susp.	Diss.									
T35-148	16.	250	80	170	8.6	**	1.5	51	10				
T35-149	12.	240	70	170	8.4	0.50	0.52	37	20				
T35-150	--	50200	50000	200	9.7	--	20.	21620	17600				

** Exhausted

T35-148	1.	Zeolite softener backwash to Kenilworth Slip - Grab 10:00 a.m.
T35-149	2.	Water filter backwash to Kenilworth Slip - Grab 10:00 a.m.
T35-150	3.	Discharge from lime blanket to Kenilworth Slip - Grab 10:30 a.m.

PROCTER AND GAMBLE CO. OF CANADA LTD.

This industry was visited on July 19, 1971 and preliminary survey information was obtained from Messrs. S.M. Baker, Chief Engineer and W. R. Harrison, Plant Engineer.

The plant is located on Burlington Street East, in Hamilton. The mailing address is P.O. Box 589, Hamilton.

DETAILS OF SURVEY

Personnel Interviewed

Mr. S. M. Baker	- Chief Engineer
Mr. W. R. Harrison	- Plant Engineer
Mr. C. Huculak	- Assistant Plant Engineer

Personnel Participating

Mr. G. V. Buxton	- OWRC
Mr. D. R. Ireland	- OWRC

Description of Process

The Hamilton plant produces shortening, soaps, synthetic detergents, glycerin, tooth paste and shampoo.

The raw materials for the production of shortening are animal and vegetable oils. The oils are refined to remove the free fatty acids. The coloured oils are bleached with bleaching earth. The oil is then hydrogenated in the presence of nickel catalyst, which hardens the oil. The oil is then deodorized by a vacuum process which is maintained by steam ejectors and barometric leg condensers. The oil is then cooled and blended with other fats to produce a finished product.

Soap is produced from tallow. The tallow is hydrolyzed in the presence of a zinc oxide catalyst. Glycerine and water is removed from the bottom of the hydrolyzer. The fatty acid from the top of the hydrolyzer is flashed to remove water and then distilled at a high vacuum. The vacuum is maintained by steam ejectors and barometric leg condensers. The purified fatty acid vapours are condensed and neutralized. Various other ingredients are added and the finished product is formed.

Detergents are produced from straight chain alkyl benzene which is sulfonated with oleum. The sulfonated product is neutralized. Additives are incorporated and the mixture is dried at which time other ingredients are added. The finished product is then packaged.

Synthetic detergents are also produced from fatty alcohols which are sulfonated with chlorosulphonic acid. The product is neutralized and cooled. Other ingredients are then added and the product is packaged.

Glycerine is produced by evaporating the water from the glycerine-water mixture from the soap process. A vacuum is maintained on the evaporator by steam ejectors and barometric leg condensers. The crude glycerine is then vacuum distilled and the vapours are condensed. The purified glycerine is then bleached and sold.

Operating Schedule

24 hours/day

5-6 days/week

850 employees

Water Consumption and Distribution

Water is obtained from both the Hamilton Public Utilities Commission and from Gage's Inlet. Based on information received from the P.U.C., the City water consumption for the year 1970 was 543,882,000 gallons. This represents an average daily consumption of approximately 2 MGD based on a 250 - day work year. The consumption of Bay water is from 6 to 8 million gallons per day.

The City water is used for domestic purposes, cooling and in the processing. All water obtained from the Bay is used for cooling purposes.

All process water, or 8 to 10 million gallons per day, is discharged to the City sanitary sewer to be treated at the Hamilton S.T.P.

Sources of Liquid Waste and Disposal

The main source of waste water is from the barometric leg condensers which are located on the deodorizers, fatty acid vacuum still, glycerine evaporators and glycerine stills. The barometric leg condensers effluents flow into hotwells where a partial separation of fatty organic material takes place. All

of this water is discharged to various sanitary sewers.

Floor and equipment washings are sources of periodically sewer'd waste. These are discharged to sanitary sewers.

All cooling water used at the plant is discharged to sanitary sewers, as are all domestic wastes.

Bleaching earth sludge is collected in a hopper and is trucked away in a cement truck to a land disposal site. Carbon black used to bleach glycerine is disposed of twice a week by a contractor in a dry bulk garbage bin.

Only roof drainage and storm run-off enter storm sewers on the outskirts of the plant property along Ottawa Street and Industrial Drive. There are several storm sewer outlets to Burlington Street but these are at present capped off.

SAMPLING AND ANALYSIS

No samples were collected at this plant.

CONCLUSIONS

At the time of the survey no industrial process water was discharged to a storm sewer and, therefore, all wastes were receiving treatment at the Hamilton Sewage Treatment Plant.

RECOMMENDATIONS

To reduce the hydraulic load on the sewage treatment plant, uncontaminated cooling waters currently discharged to the sanitary sewer should be redirected to the storm sewer.

QUAKER CITY CHEMICAL COMPANY LIMITED

This industry was visited on July 30, 1971 at which time survey information was obtained from Mr. Bailey, Plant Superintendent.

The plant is located at 16 Birmingham Street in Hamilton.

DETAILS OF SURVEY

Personnel Interviewed

Mr. Bailey - Plant Superintendent

Personnel Participating

Mr. D. R. Ireland - OWRC

Description of Process

The raw materials used at the plant are animal, vegetable and mineral oils.

The oils are batch sulfonated, compounded and blended in tanks.

The products are sulfonated oil detergents, finishes for fibres in the textile industry, degreasing agents, fatliquoring oils, defoaming agents and other oils for the textile industry.

Operating Schedule

8 hours/day

5 days/week

12 employees (5 in plant)

Water Consumption and Distribution

All industrial and domestic water is obtained from the Hamilton Public Utilities Commission. Based on Company water bills, water consumption for 1970 was 1,655,000 gallons and for the first six months of 1971 was 1,801,000 gallons, due to increased production.

Water is used for domestic purposes and in most products. It is also used to wash out the tanks between batches.

Sources of Liquid Waste and Disposal

The two sources of liquid wastes are domestic wastes and tank washings. The tanks are washed with water and non-ionic detergents.

All process wastes are collected in a sump and are pumped into the municipal sanitary sewer. Floating oil and settled solids are removed from the sump and stored in drums prior to disposal by a disposal firm.

SAMPLING AND ANALYSIS

A grab sample of the contents of the sump discharged to the sanitary sewer was obtained. This sample was submitted to the OWRC laboratories for analysis in accordance with modifications to the procedures outlined in "Standard Methods for the Examination of Water and Wastewater", 12th edition, an American Health Association publication.

ANALYTICAL RESULTS

Analytical results are appended to this report.

DISCUSSION

All wastes from the plant were discharged to the municipal sanitary sewer. This information was supplied by the City of Hamilton.

The waste discharged from the sump contained excessive concentrations of BOD_5 , SUSPENDED SOLIDS and ETHER SOLUBLES, and should receive pretreatment prior to discharge to the municipal sanitary sewer.

CONCLUSIONS

The concentrations of wastes discharged from the plant to the municipal sanitary sewer were in excess of municipal sewer-use by-law limitations.

RECOMMENDATIONS

Any recommendations concerning pretreatment requirements will be at the discretion of the City Engineer.

ONTARIO WATER RESOURCES COMMISSION
CHEMICAL LABORATORIES

INDUSTRIAL WASTE ANALYSIS

All analyses except pH reported in
p.p.m. unless otherwise indicated

1 p.p.m. = 1 mgm. / litre
= 1 lb./100,000 Imp. Gals.

Municipality: Hamilton

Report to: G. V. Buxton

c.c.

Source: QUAKER CITY CHEMICAL CO. LTD.

Date Sampled: July 30/71 by: D. R. Ireland

Lab. No.	5-Day B.O.D.	Solids			pH	Ether Solubles	Phenols in ppt	Phosphorus as P	Total Kjeldahl as N	COP	
		Total	Susp.	Diss.							
T31-4	6,000	9360*	5960	3400*	6.1	1.1%	30	24	200	30,000	

* oily residue

T31-4	1. Total Waste Flow at sump - Grab 11:30 a.m.
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RED-D-MIX CONCRETE COMPANY

Red-D-Mix has two plants located on the Bayfront. One is located on Victoria Avenue North and the other on Windermere Avenue.

SUMMARY

The Company is a dry industry engaged in the processing of ready-mix concrete and asphalt. Mr. P. Mollard, Operations Manager, was not available for comment at the time of this survey.

DETAILS OF SURVEY

Personnel Interviewed

Mr. Burt Scheer - Asst. Plant Supervisor

Personnel Participating

Mr. D. R. Ireland - OWRC

Mr. J. C. de la Riviere - OWRC

Description of Processing

Red-D-Mix makes ready-mix concrete and asphaltic cement. Concrete is made by blending together aggregate, sand, cement, water and additives. The agitation of this blend is provided by ready-mix trucks on the way to the site of construction. Asphalt as used in road construction is a mixture of tar or pitch with aggregate.

Production and Operating Data

The dock plant (Victoria Ave.) has 31 employees, the East plant (Windermere) has between 20 and 30 employees. The production is carried out on an average of 10 hours a day, five days a week. No figures as to production were given.

Water Consumption and Distribution

The water used is supplied by the City of Hamilton. Consumption during the year April 1970 to April 1971 was 178,000 gallons. No other water source is used.

Sources of Liquid Wastes and Disposal

All domestic wastes are directed to the sanitary sewer. Fuels, i.e. gas, diesel and bunker C, are stored underground. Trucks are maintained on the premises. The waste oil from maintenance operations is stored and is used for spraying the roads, i.e. dust control.

CONCLUSIONS

There did not appear to be a water pollution problem associated with this industry at the time of this survey.

RECOMMENDATIONS

There will be no recommendation made at this time.

RHEEM CANADA LIMITED

This plant, located at 128 Barton Street West (P.O. Box 846), was visited on August 4, 1971. Mr. R. Mazey, Plant Manager, was unable to provide information necessary for the conduct of this industrial waste survey.

The Company was requested to submit the required information. A report will be issued pending receipt of this information.

STANTON PIPES LIMITED

This industry was visited on July 20, 1971 and preliminary survey information was obtained from Mr. R. K. Rennie, Plant Manager. Samples were collected on July 22, 1971.

The plant is located on Kenilworth Avenue North in Hamilton. The mailing address is P.O. Box 849, Hamilton.

DETAILS OF SURVEY

Personnel Interviewed

Mr. R. K. Rennie - Plant Manager

Personnel Participating

Mr. G. V. Buxton - OWRC

Mr. D. R. Ireland - OWRC

Description of Process

The plant produces several different types of iron and steel pipes. Pig iron is received at the plant and is melted down in a cupola. The cupola is water cooled with the water being recirculated and also used as a stack gas scrubber. There is a bleed-off to the storm sewer after the effluent has been pH adjusted.

The iron is spun cast into various sizes of pipe. There is a water bleed-off from the recirculating cooling water for the casting machine.

Other types of pipe produced are concrete lined cast iron pipe, spiral weld steel pipe, ductile iron pipe and flanged pipe. The pipes are hydrostatically tested and spray-painted.

Operating Schedule

8 - 16 hours/day

5 days/week (some water used 6 days/week)

150 employees.

Water Consumption and Distribution

All industrial and domestic water is obtained from the Hamilton Public Utilities Commission.

Water consumption at the time of sampling was approximately 1,800,000 gallons each week. About 1,785,000 gallons of this would be used for industrial purposes.

This water is used only as cooling water, stack gas scrubbing and for pressure testing. The water consumption for each purpose is unknown.

Sources of Liquid Waste and Disposal

The sources of liquid wastes from this industry are as follows:

- (1) domestic wastes
- (2) bleed-off water from cupola cooling and stack gas scrubbing
- (3) cooling water bleed-off from casting machine
- (4) pressure test water.

All domestic wastes are discharged to the City sanitary sewer. All industrial wastes are discharged to the storm sewer which discharges into the Kenilworth Slip.

The cooling water from the cupola is also used as a stack gas scrubber. It is recirculated with a bleed-off to the storm sewer after it has been pH adjusted to 7 with NaOH. The cooling water from the spin casting machine is also recirculated with a bleed-off to the storm sewer.

There is no waste discharged from the spray painting booth since there is no water curtain. The waste from the concrete lining operation is collected in a catch basin with no discharge.

SAMPLING AND ANALYSIS

A grab sample of the combined industrial waste discharge to the Kenilworth Slip was obtained on July 22, 1971.

The sample was submitted to the OWRC laboratories for analysis in accordance, with modifications, of the procedures outlined in Standard Methods for the Examination of Water and Wastewater, Twelfth Edition, an American Health Association publication. The analyses results are appended.

STATEMENT OF RESULTS

The waste loading from the plant to the Kenilworth Slip was calculated using an average daily flow figure of 357,000 gallons as estimated by Company personnel.

WASTE LOADINGS

WASTE	FLOW IGPD	SUSPENDED SOLIDS ppm	IRON AS Fe ppm	PHENOLS ppm	PHENOLS lbs/day
Combined process discharge to Ken- ilworth Slip	357,000	630	2,250	79	282

DISCUSSION

The concentration of suspended solids, iron and phenols in the plant effluent all exceeded the OWRC objectives for discharge to a watercourse. The high concentration of suspended solids was probably the result of much of the water used as a stack gas scrubber. The stack gas scrubber effluent probably contributed significantly to the unsatisfactory level of suspended solids in the total discharge.

CONCLUSIONS

The effluent from this plant was found to be in excess of OWRC water quality objectives and is, thus, unacceptable for discharge to a watercourse.

RECOMMENDATIONS

The Company should investigate the source or sources of the high concentrations of suspended solids and iron. These wastes should then be segregated and treated to reduce suspended solids and iron to an acceptable level.

ONTARIO WATER RESOURCES COMMISSION
CHEMICAL LABORATORIES

INDUSTRIAL WASTE ANALYSIS

All analyses except pH reported in
p.p.m. unless otherwise indicated1 p.p.m. = 1 mgm. / litre
= 1 lb./100,000 Imp. Gals.

Municipality: Hamilton

Report to: Mr. Burton (Ind. Waste)

c.c.

Source: Hamilton Fibres Ltd.

Date Sampled: July 22/71 by: T. J. Ireland

(nj)

Lab. No.	5-Day B.O.D.	Solids			% at Lab.	Iron as Fe	Phenols in p.p.m.				
		Total	Susp.	Diss.							
EW-167		10.0	(CD)	10	2.7	70.	20				
TG-167	1	Combined Process discharge to Kenilworth's Lin				Grab 2.15 Pt					

TAYLOR FORGE CANADA LTD.

This Company is engaged in the processing of rough forgings into high quality forged products. The Plant Manager, Mr. R. D. Holland, was interviewed and a plant tour was conducted by Mr. R. Tyler, Maintenance Supervisor. The plant is located at 1675 Burlington Street East.

DETAILS OF SURVEY

The survey was conducted on July 28, 1971.

Personnel Interviewed

Mr. R. D. Holland - Plant Manager

Mr. R. Tyler - Maintenance Supervisor

Personnel Participating

Mr. J. C. de la Riviere- OWRC

Description of Process

The raw materials are rough forged products and castings. The forgings are machined, treated and finished into a number of different high pressure type products. Processing includes welding, machining, punch pressing etc. into specified products. The products are hubs, castings, elbows, valves etc. Each finished piece is paint-dipped.

Water Consumption and Distribution

Water is used for sanitary and domestic purposes only.

In the year April 1970 to April 1971 the water consumption as reported by the City of Hamilton was 989,000 gallons.

Sources of Liquid Waste and Disposal

The only sources of liquid wastes in the process result from cutting oils, lubrication oils and paint.

The cutting oils are recirculated in the machines as each has its own reservoir.

The lubrication oils and hydraulic oils, when spilt on the floor, are absorbed by chemical oil absorbers and the resulting solid refuse is collected for disposal.

The painting is a dip operation and each item is treated with fast dry agents. No liquid wastes are produced.

I. Waxman and Son Ltd. and Lax Iron Ltd. are the scrap metal and industrial refuse removal agents.

CONCLUSIONS

This industry appears to be a dry operation. There were no pollution problems evident at this plant at the time of the survey.

RECOMMENDATIONS

There will be no recommendations made at this time.

UNION DRAWN STEEL CO. LTD.

This industry was visited on July 30, 1971, at which time Mr. J. Paliwoda, Plant Superintendent, was interviewed to obtain survey information.

The plant is located at 1350 Burlington Street East in Hamilton. The mailing address is P.O. Box 98, Hamilton.

DETAILS OF SURVEY

Personnel Interviewed

Mr. J. Paliwoda - Plant Superintendent

Personnel Participating

Mr. D. R. Ireland - OWRC

Description of Process

The raw materials received at the plant are hot rolled steel bars. The products are cold finished steel bars. The plant produces up to 3000 tons per month and at the time of the survey was producing 2400 tons per month.

The hot rolled bars are mechanically descaled. They are then reduced in cross-section to tolerance. This is done by drawing the bars through tungsten-carbide dies. The bars are cooled and lubricated by oil during this process. To increase lubrication, they are sometimes lime-coated from a lime tank and oil cooled. The bars are then cut, straightened and shipped.

Operating Schedule

24 hours/day (40% of plant) 8-16 (60% of plant)

5 days/week

93 employees (in mill)

Water Consumption and Distribution

All industrial and domestic water is obtained from the Hamilton Public Utilities Commission. Water consumption from April 1970 to April 1971 was 11,356,000 gallons, based on information received from the Hamilton P.U.C. This is an average daily consumption of approximately 45,000 gallons, based on a 250-day work year.

Water is used for the following purposes:

- (1) drinking and domestic uses
- (2) heating radiators (closed system)
- (3) water and oil mixture as recirculated coolant (not discharged)
- (4) mixture in lime tank
- (5) compressor cooling water.

Sources of Liquid Waste and Disposal

The oil used for cooling and lubricating the bars is collected in sumps and recirculated. The lime sludge is also collected in the oil sumps. The clean oil is recirculated and the dirty oil and lime sludge is picked up by a local industrial disposal company.

The oil and water mixture used as a coolant for two grinders, a turning machine and a saw is not discharged but is circulated in a closed system. There are facilities in this system for removing concentrated solids.

The only industrial liquid waste which is discharged is the compressor cooling water. This is uncontaminated, non-circulated water, which is discharged to a storm sewer.

All domestic wastes are discharged to a sanitary sewer.

SAMPLING AND ANALYSIS

No samples were collected at this plant.

CONCLUSIONS

There were no pollution problems evident at this plant at this time.

RECOMMENDATIONS

No recommendations will be made.

VENETIAN MEAT & SALAMI CO. LTD.

The company was visited on July 19 and August 4, 1971. Information for the survey was supplied by Mr. R. H. Drury, Department of Animal Health.

The company's address is 947 Burlington Street East. Mr. Gino Dalbello, Manager, was not available for comment.

DETAILS OF SURVEY

Personnel Interviewed

Mr. A. Macaluso - Bookkeeper

Personnel Participating

Mr. D. R. Ireland - OWRC

Mr. J. C. de la Riviere - OWRC

Description of Process

The Company produces processed meat products; i.e. mortadella, salami, capacola etc. The Company purchases custom cut meats. The meats are further processed with spices, flavorings and fats being added. The finished meat is then dry cured.

Production and Operating Data

The processing is done in an 8 hr. day, 5 days a week, with a washup shift after each process day.

The Company has 29 employees and processes from 25,000 to 30,000 lbs. per week.

Water Consumption and Distribution

The consumption of water over a three-month period (April to June 1971) was 1,692,000 gallons. According to municipal officials all waste waters are discharged to the sanitary sewer.

Sources of Liquid Wastes, Treatment and Disposal

No water is used in the actual processing at this plant.

In the processing of Capacola, made one day a week, chunks of fat are

water washed prior to being added to the meat.

Most of the cured meats develop a mold on the outside of the package. This mold is washed off prior to distribution.

Wastes are also generated in the daily plant wash-up. All the meat residues, on the floor or equipment, and all spilt fats and greases are included in this wash water.

The Company has a grease trap located at a point where all spent waters would be collected. The grease, along with any solid wastes, are removed by Gordon Young Ltd., Toronto, regularly.

CONCLUSIONS

All waste waters are directed to the municipal treatment plant.

RECOMMENDATIONS

Any recommendations made concerning this plant will come from the City Engineer.

I. WAXMAN & SON CO. LTD.

The company is located at 75 Windermere Road (P.O. Box 3460, Station C) and is in the scrap metal business. It is also in the industrial wastes removal business.

SUMMARY

The company separates ferrous and non-ferrous scrap metal. The ferrous scrap is supplied to the steel companies, non-ferrous scrap to other mills. The industrial wastes removal business disposes of all wastes at the Hamilton City Dump.

DETAILS OF SURVEY

Mr. M. Waxman was interviewed August 4, 1971 and Mr. T. Edwards was interviewed on August 11, 1971.

Personnel Participating

Mr. D. R. Ireland - OWRC

Mr. J. C. de la Riviere - OWRC

Personnel Interviewed

Mr. Morris Waxman - President

Mr. Ted Edwards - Manager, Industrial Wastes Disposal.

Description of Process

The company collects scrap metals, segregating ferrous and non-ferrous metals. The scrap metals are baled and used as charge by smelters and foundries. The non-ferrous metals include aluminum, carbides, bronze, copper etc. The ferrous metals include steels with various finishes such as chromium etc., as well as cast and wrought iron, crucibles and alloys etc.

The industrial wastes collection operation is handled separately. All wastes are land deposited, regardless of their origins or compositions, on city dump areas in the locality.

Operating Schedule

9 hours/day

5 - 7 days/week

75-100 employees

Water Consumption and Distribution

Based on information supplied by the City of Hamilton, the Company consumed 616,000 gallons of water from April 1970 to April 1971.

This water is used for domestic purposes and coolant for one of the metal presses.

Sources of Liquid Waste and Disposal

All domestic wastes are directed to a septic tank and field tile system. The cooling water from the water jacket on the metal press is discharged to the ground on plant property.

SAMPLING AND ANALYSIS

No samples were collected at this industry since the only process water was uncontaminated cooling water.

CONCLUSION

There were no sources of water pollution evident at this industry at the time of this survey.

RECOMMENDATIONS

No recommendations will be made.

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